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ON THE IMPORTATION OF MINERAL WATERS.

By JOHN M. MAISCH.

In continental Europe, the practice has been prevalent for a considerable length of time of sending the water of many mineral springs abroad, put up in glass bottles or in jugs. This practice has been found remunerative, since it was imitated with the waters of several mineral springs of our country, and, among others, those from the various springs of Saratoga are probably found now in all towns of some note on the North American continent. The mineral wealth in which the Union abounds, makes it more than probable that we likewise possess springs charged with the most different saline compounds, which, when once known, would prove highly valuable auxiliaries and remedial agents in the hands of a judicious physician.

It appears to me, that this subject has been, from some cause or other, too much neglected, while, if we look at the success of the multitude of watering places in Europe, and at the enormous quantities of water bottled and sent out from them, it might well instigate all concerned to pay more attention to it here. But does the necessity exist for us as much as for Europe, where such matters usually obtain the influence of the various governments? As an answer thereto, we need but look to the importation of foreign mineral waters into this country, and we will find that the quantities brought on here from France and particularly Germany, exceed probably the expectation of all.

If we refer to the lists of importation of drugs, as published in the Druggists' Circular and compiled in several reports to the

American Pharmaceutical Association, we find that the importation of mineral waters has largely increased within the last two years. The reports of the drug importations at the port of New York, published in the Proceedings of the American Pharmaceutical Association for 1856 and 1857, contain no mineral water. During the year ending August 20th, 1858, 37 cases and 313 baskets passed through the New York Custom House; of this amount 24 baskets had been entered as Vichy, and 260 baskets as Seltzer water. In 1859, the publication of the imports had been omitted from July to October; for the remaining 8 months, ending with December 20th, the quantity of imported mineral water reached 330 casks, 684 baskets and 19 cases.

For the year 1860, we have full reports of all imported articles of the drug line, together with their cost price. Much valuable information may be derived from comparing these lists, which, if carefully compiled every year, would show our wants as satisfied from abroad, and would constitute interesting statistics of the foreign drug trade of New York, the most important port for this branch of commerce in the United States. One addition to these drug lists, it appears to me, would materially enhance their value as a source for statistical information, and would show us on what distant countries we still rely for the supply of our medicinal and similar technical articles. I refer to statements of the places from whence imported. Generally we are able to find out the countries from the value of the drugs being stated in the currency of the places of their exportation, but some uncertainty must remain; as, for instance, the currency of France, Belgium and Switzerland is francs, that of Holland, Southern Germany and the Austrian empire is guilders, &c. This uncertainty could, of course, not be overcome in the following table, which comprises the whole of the mineral water importation at the port of New York for the year ending December 20th, 1860.

During those twelve months, it consisted of 999 casks, 39 hampers, 279 cases, 3635 baskets and 2887 other packages, of the aggregate cost of \$24,618.83, by far the largest amount of which was paid to Germany, that imported from England even being probably all from German springs.

ON THE IMPORTATION OF MINERAL WATERS.



Values of Mineral waters imported at New York from

1860.	South Germany.	North Germany.	France.	England.	Other Countries.	Total.
January,						
February,	\$1460.80		\$114.07		\$50.00	\$1624.87
March,						
April,			263.34			263.34
May,						
June,	248.00		28.19			276.19
July,	2324.93					2324.93
August,	3304.86					3304.86
September,	4069.88	136.11		84.39		4290.38
October,	3835.20	136.11	29.65			4000.96
November,	1156.62		453.60	63.05		1673.27
December,	6114.46			741.57	4.00	6860.03
Total.	\$22514.75	272.22	888.85	889.01	54.00	24,618.83

Of about one-tenth only the spring was stated. From Southern Germany 1276 baskets of Seltzer water were imported at a cost of \$2915.20, averaging \$2.28 per basket, the lowest price of a basket being \$1.40, and the highest price \$4.53. Of the 39 hampers coming from England, 36 were entered likewise as Seltzer water, at \$825.96, being an average of \$22.94 cts. per hamper, the lowest price of which was \$22.47, and the highest \$28.13. Among the mineral water from France were 127 cases of Vichy water, costing \$618.60 or \$4.87 per case, of which the lowest price was \$4.53, and the highest \$7.41. The price of mineral water from "other countries" in the above table was stated in United States currency, in consequence of which no conclusion could be drawn as to its place of exportation; it comprised 50 casks at \$1 each, and 1 basket at \$4.

If we assume the price of the mineral water imported in 1858 at \$7 per case and \$3.50 per basket, which is about 50 per cent. above the average prices as stated before, the whole cost of it was \$1354.50, and the importation of mineral water has therefore increased 18½ times in the short space of two years. These figures are undoubtedly the best proof for the increased demand, and we must remember that considerable quantities of artificial mineral waters are also manufactured in some of our large cities. I do not refer here to the carbonic acid water which is now everywhere sold under the name of mineral or soda water, but to the imitation of the water of various springs, which is likewise carried on in Europe to a large extent.

It would be interesting to obtain *reliable* information of the amount of water sent abroad from our American springs; but still it remains an important question, why we have to draw to such an extent on Europe for a supply which undoubtedly might be met from our own springs.

The true cause appears to me to lie in the fact, that our mineral waters are either not fully, or have not frequently enough been analyzed. On the continent of Europe, the analysis of mineral waters and their deposits is considered most important, and is usually repeated at different seasons and at an interval of several years, in order to ascertain whether the contents of the water vary with the season or change in the course of time. Thus it is, that of all the important springs a number of analyses are extant which allow a comparison of the varying or unchangeable qualities of the water, and confirm or strengthen the confidence reposed in its medicinal virtues.

The greatest number of such analyses are yearly made and published in Germany and France, where even periodicals are solely devoted to balneology. If the proprietors of mineral springs in America would pursue a similar course, they would undoubtedly advance their own interests, and besides stimulate scientific researches in these productions of our soil.

A large portion of the retail trade in mineral waters is in the hands of the pharmacentists, who, for this reason, have, aside from the scientific, also a pecuniary interest in this matter, which latter would doubtless be promoted, if accurate analyses were furnished of the waters obtained directly at the springs, and probably likewise after they have been kept for some time, so that the intelligent physician might be enabled to exercise his judgment as to the particular cases, in which they will be indicated.

Philadelphia, January, 1861.

ON MEDICINAL ACONITIA AND ITS SUBSTITUTES.

BY WILLIAM PROCTER, JR.

The high price and variable quality of aconitia, has rendered its use as a medicinal agent so expensive and uncertain, that many physicians never employ it, depending upon the stronger

tinctures of the root, in cases requiring the external use of aconite. In the manufacture of organic chemical products very much is added to their cost by the complications and loss rendered necessary or unavoidable in their purification from coloring matter, or strongly adherent resinous or other inert substances in minute quantity, which, whilst their presence impairs the market value of the chemicals, often do not greatly reduce their medicinal power. In asking the attention of pharmacutists to the following modification of Headland's process for aconitia, it is with the view of furnishing them with a practicable means of supplying their own wants in regard to this potent alkaloid.

It is proper to premise that aconite root contains a green fixed oil, solid below 70° Fahr., which it is important to remove entirely from the solution, before attempting to extract the alkaloid by the agency of ether, a precaution only partially carried out in the published process of Dr. Headland. When a tincture of aconite root in alcohol of sp. gr. .835, whether prepared in the cold by percolation or by digestion at the temperature of boiling alcohol, as recommended by Headland, is evaporated to one half the weight of the root treated, a quantity of the green fatty oil above noticed, separates and floats upon the surface of the liquid. Most of this may be strained out, if the temperature is below 70° F., but a portion, together with some resin, remains intimately combined in the clear liquid, and it is this which is not removed previously to adding the ammonia, in the process of Headland. Further, aconitic acid is soluble in ether, and aconitate of ammonia may be slightly so, in which case it also would tend to contaminate the aconitia in that process.

Take of Aconite root, in fine powder, five pounds.

Alcohol, .835.

Ether,

Stronger solution of Ammonia, each a sufficient quantity.

Moisten the aconite root with two pints of alcohol, and let it stand twenty-four hours in a covered vessel, then, having packed it closely in a cylindrical percolater, pour on alcohol until three

gallons have slowly passed, or until the root is so far exhausted that the passing liquid has little, if any taste of aconite. To the tincture thus formed, add an ounce of lime, previously hydrated and in powder, and agitate them together, separate the precipitate which forms, by straining through a close cloth, and saturate the liquid with diluted sulphuric acid till slightly acid. Filter the liquid through a close filter and distil off the the alcohol, until the remaining liquid measures about a pint and a half. Remove any fixed oil which may separate on standing, and having continued the evaporation to a syrupy consistence, agitate it well with four fluid ounces of ether in a suitable bottle, and decant the ether when it has separated. Then add the solution of ammonia in excess, agitate thoroughly, wash the mixture with repeated portions of ether, by agitation and decantation, and having mixed these last ethereal liquids, allow the ether to evaporate spontaneously from a capsule, until the aconitia remains as a dry amorphous shining residue, which should be removed from the capsule, powdered and preserved for use in a stopped vial.

As thus obtained, aconitia is a powder of greenish or brownish-white color, uncrystallized, very soluble in alcohol, ether and chloroform, saturates acids, and has a strong alkaline reaction. It irritates the nose powerfully when a minute particle is inhaled, but does not excite sneezing.

Modes of using Aconitia.—When aconitia is to be employed in the form of an ointment, its activity may be much increased by adding to it a sufficiency of acetic acid to salify it, which renders it more readily absorbable in contact with the skin. The powder should first be triturated with a few drops of alcohol and the acid added to this, in the proportion of a drop of acetic acid to each grain of the alkaloid.

Glycerole.—When aconitia is mixed with a slight excess of acetic acid, it readily dissolves in glycerin, and in this state may be applied by friction to the surface requiring its anæsthetic action. The proportion of the alkaloid to each preparation, must be regulated by the prescriber; two or three grains to the drachm of prepared lard is a maximum strength for the ointment, and from this down to one grain.

SUBSTITUTES FOR ACONITIA.

Tinctura Aconiti Radicis, U. S. P.—This preparation is of such strength, that two pints of the tincture is intended to represent twelve ounces troy of aconite root. Owing to the hard and resistant structure of this root, and from the annoyance arising from the dust in effecting its pulverization, I believe this tincture to be, oftentimes, an imperfect representative of the amount of aconite used. It is suggested to those who have not a suitable mill for grinding this root, that it may be exhausted by bruising it well in a metallic mortar, with the addition of just sufficient alcohol to prevent dust arising, until fine enough for percolation. Then having added sufficient alcohol to completely saturate the powder, let it stand two days, and pack it firmly in a percolater. Pour on alcohol (which should pass slowly) until the root is nearly exhausted, (about three pints for each pound troy of the root.) Then evaporate the tincture in a water bath to two pints, and filter. This plan insures the exhaustion of the root, if due care is taken. When the aconite root can be obtained in fine powder, as through a sieve 60 meshes to the inch, it is best to proceed by direct percolation, after moistening the powder with a fourth of its weight of alcohol.

Fleming's Tincture of Aconite Root should be made with the same precaution, and in this case it is even more necessary as the proportion of root to tincture is larger.

Aconite Liniment, is the name given to a concentrated solution of aconite, with a portion of glycerin, originally prepared by the writer of this paper. (Amer. Jour. Pharm. vol. xxv. p. 293.) An experience of eight years with this preparation, warrants the opinion that it is strongly deserving of the attention of the medical profession. A fluid ounce of this preparation represents two ounces of the root; it is therefore about five times the strength of the Official Tincture, and about three times that of Fleming's tincture. I have for years past adopted the custom of keeping a normal solution of aconite root, obtained by thoroughly exhausting the drug with alcohol, and evaporating the tincture, until each fluid ounce represents two ounces of the root, removing the fixed oil that separates, and if necessary agitating it with a little diluted alcohol to remove any adherent

aconitia and extractive matter. From this the weaker preparations are made by dilution, and the stronger by evaporation, thus :

Tinctura Aconiti Radicis. U. S. P.

Take of Normal solution of aconite, three fluid ounces.

Alcohol, twelve fluid ounces.

Mix them.

Fleming's Tincture of Aconite Root.

Take of Normal solution of aconite, five fluid ounces.

Alcohol, ten fluid ounces.

Mix them.

Aconite Liniment.

Take of Normal solution of aconite, half a pint.

Glycerin, a fluid ounce.

Evaporate the solution to seven fluid ounces, add the glycerin, and mix them.

Aconite Plaster.

Take of Normal solution of aconite root, half a pint.

Adhesive plaster, a sufficient quantity.

Evaporate the solution of aconite until it assumes the consistence of thick honey, then, having weighed it, add as much adhesive plaster, previously melted, as will make the whole weigh sixteen ounces.

Extractum Aconiti Radicis.

Take of Normal solution of aconite, half a pint.

Evaporate it carefully on a water bath until reduced to the proper consistence for an extract.

In regard to the merit of this mode of proceeding, it can be said that it assures the thorough extraction of the aconite, and promotes uniformity in the strength of the preparations, and also affords a very great convenience to the dispenser, who can, by preparing a quantity of the strong solution, quickly produce the other preparations at will, in quantities to suit his requirements.

Philadelphia, Feb. 19th, 1861.

ANALYSIS OF THE CHALYBEATE WATER FROM SHARON
SPRINGS, N. Y.

BY JOHN M. MAISCH.

There are several springs of mineral water in the vicinity of Sharon Springs, which is situated 45 miles west of Albany, in the State of New York. The springs are called White Sulphur, Magnesia and Chalybeate Springs, from their most predominating contents. According to an analysis of the last named, its water contains in one gallon sulphate of magnesia, 8.56; sulphate of soda, 1.00; sulphate of lime, 16.36; sulphate of iron, 86.00; altogether, 111.92 grs. solid matter. The temperature is stated to be invariably 48° F.

I have had occasion to examine some of this water, which had been sent on to this city, from which fact I am not able to give the composition of the recent spring water. My analysis differed so much from the foregoing, that I came to the conclusion, the water must have changed through the influence of organic matter, probably of a cask, which latter supposition proved to be correct, as the spring is said to be destitute of the odor of sulphuretted hydrogen, and the water in question had been sent in an entirely new barrel. Moreover, in the demijohn I found a black precipitate, consisting of sulphide of iron, thus showing plainly that a very considerable amount of iron had been precipitated by the reaction indicated before.

This analysis cannot, for these reasons, have the same interest as if it had been performed with water drawn by me directly from the spring; nevertheless it shows the amount of alkalies and alkaline earths the water contains, and, provided the above analysis is correct, would prove that the proportion of its contents are to some extent variable.

As near as I could ascertain, the water had been drawn last fall. When I received it, it had a not very strong odor and taste of sulph-hydric acid; it possessed a slight acid reaction, and had at 60° F. a specific gravity of 1.0012.

After determining the quality of its contents, the following quantities were obtained from one gallon: sulph-hydric acid, 0.2796 grs., sulphuric acid, 44.752 grs., carbonic acid, 9.447

grs., lime, 26.2617 grs., magnesia, 8.4434 grs., sesquioxide of iron, 0.791 grs., soda, 1.6389 grs., potassa, a trace. No chlorine, arsenic or any other heavy metal besides the little iron was found.

From these results the following quantities of anhydrous salts are calculated :

Bicarbonate of magnesia,	15.1148	grains.
Sulphate of lime, . .	63.8024	"
Sulphate of magnesia, .	8.1546	"
Protosulphate of iron, .	1.4040	"
Sulphate of soda, . .	3.7401	"
Sulphate of potassa, .	trace.	
<hr/>		
Inorganic contents, . .	92.2159	"
Organic matter, . .	28.48	"
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	120.6959	"
By direct evaporation at 240° F.,	119.26	"
Sulph-hydric acid gas, .	0.7702	cubic inches.

The estimate of organic matter is the mean of two experiments closely agreeing in result ; it was free of aprocrenic and crenic acids. After evaporation and drying the residue at 240° F. one half of the carbonic acid had been evolved, and the remainder was in combination with lime. Deducting the expelled acid and adding one equivalent of water retained by the sulphates of magnesia and iron at this temperature, the residue ought to have weighed 119.2491 grains, or .0109 grs. less than found.

The spring must contain a considerable quantity more of iron and sulphuric acid, but whether it is free of carbonic acid, cannot be deduced from my investigations, which, if no sulphuretted hydrogen had been lost by previous exposure, would on the contrary necessitate its presence. The analysis, however, shows, that the water, after its true natural constitution shall have been ascertained, may take its place probably among the best chalybeate springs of this or the European continent.

Philadelphia, January, 1861.

ON ANACAHUITE WOOD.

By Jno. M. MAISCH.

Some time in August or September last, the New York "Criminalzeitung" published a correspondence from Berlin, Germany, which contained a statement to the effect that the Prussian consul at Tampico, Mexico, had notified his government of a wood, which is called there anacahuite, and is extensively employed with the most beneficial results in tubercular consumption. This report was considered by the government of Prussia of sufficient importance to determine on testing its efficacy in the Charité, the celebrated hospital in Berlin. The wood, it is asserted, is rare in Mexico, and the agents of Prussia have seized upon it to such an extent, that it is now difficult for others to obtain.

A subsequent correspondence of the above mentioned paper, dated Berlin, Oct. 5th, 1860, stated that the experiments with the anacahuite wood had, as yet, not led to a satisfactory result, but that they were to be continued, because it was hardly to be expected that the consul should have made such positive assertions without being satisfied of their correctness; it was added that guaiac wood, had, by some druggists in Germany, been fraudulently sold instead of anacahuite.

The "Criminalzeitung" of February 1st, publishes a paper by Dr. Krog, of New York, formerly of Berlin, which appears to be of so much interest as to warrant its translation for the American Journal of Pharmacy.

"During the summer of the past year, when the above wood was first brought to Europe, the writer has had the opportunity to observe its effects in the Berlin Charité, and to satisfy himself of the unusually favorable results. The first experiments did not prove to be so effectual as was expected, and it was supposed that a part, at least, of the alleged excellent success in Mexico must be ascribed to its climate; but subsequently it became evident that this difference was to be accounted for by the mode of preparing the wood. A simple infusion is not sufficient to extract the active principles; even heating to boiling will not entirely accomplish the object, which is attained only

by continuing the boiling for a quarter or half an hour. Such a decoction has proved very efficacious; it produced the complete resorption of the tubercles in the first stage of consumption, and afforded great relief of their distressing condition to those farther advanced. These facts suffice to make it desirable that this remedy might be extensively employed here for the benefit of the numerous patients of this class."

Such information, coming from a medical man who had witnessed the experiments, is entitled to consideration, and in view of the importance of the subject, I asked for further information, and received the following letter, which speaks for itself.

New York, Feb. 5th, 1861.

DEAR SIR:—In reply to your favor, I hasten to inform you that the anacahuite wood certainly merits the attention which it has lately received. My experience chiefly extends to its medicinal effects. At present I am unable to give the name of the mother-plant; to judge, however, from some pieces of genuine wood now before me, I am inclined to feel justified in placing it in the natural order of Papilionaceæ.

It is believed in Berlin that gratifying results have been obtained with this remedy in the first stages of phthisis pulmonalis. It is given in the form of decoction, namely ʒvi. to ʒi. of the wood to 12 to 14 oz. of water, boiled down to ʒv. , and this is taken 2 to 4 times daily, according to circumstances, combined with other remedies. It is requisite to continue the use of this remedy for several months, and to observe a diet in accordance with the nature of the disease.

Two weeks ago, I wrote to Berlin for the purpose of learning the latest observations with this wood, and I am ready with pleasure to communicate to you the results on their arrival.

Yours, &c.

KROG, M. D., 337 Tenth St.

It is proper, however, to state that Professor Bock, of Leipzig, opposes the use of anacahuite, insisting that in pulmonary consumption relief can *only* be found in the strictest regimen, by partaking of suitable food, breathing a pure and warm atmosphere, using moderate exercise, and attending scrupulously to a mental, intellectual, corporeal, and sexual rest.

WINE OF CITRATE OF IRON AND QUINIA.

BY SAMUEL CAMPBELL.

This preparation is ordinarily prepared by dissolving the salt in "pure Sherry wine," with the aid of heat, the strength varying from 2 to 5 grains in each teaspoonful.

From the fact of my having met with a dissimilarity in the commercial salt, in appearance, taste and solubility, I would propose the following formula, as being an eligible and a reliable one for extemporaneous prescription, hoping that it will prove acceptable to the profession in general.

B. Quiniæ Sulphatis,	grains 140
Acidi Citrici	" 120
Ferri Citratis	" 600
Acidi Sulphurici diluti	f. ʒiii.
Aquæ Ammoniaë	
" Destillatæ aa.	q. s.

Rub the quinia salt until perfectly miscible with four ounces of distilled water, then add the diluted acid to form a clear solution, pour it into a decanting vessel, and add gradually the solution of ammonia until it ceases to form a precipitate, being careful not to have the alkaline solution in too great an excess. The precipitate is to be carefully washed with distilled water until the washings cease to evince any further evidence of an alkaline reaction upon a piece of litmus paper previously red-dened with an acid. The hydrated quinia is then incorporated with the citric acid and citrate of iron previously dissolved in three ounces of boiling distilled water. When completely dissolved, add sufficient distilled water to make the whole measure thirteen fluid ounces. Each fluid drachm of this solution contains eight grains of the double salt. In order to prepare the wine of the citrate of iron and quinia, it may be readily done by mixing two fluid drachms of the above solution with six fluid drachms of pure Sherry wine; so that each teaspoonful will contain two grains of the salt, or the strength can be varied to meet the wants of the physician.

January 19th, 1861.

GLEANINGS FROM GERMAN JOURNALS.

By J. M. MAISCH.

Reaction of strychnia.—The solid strychnia when mixed with solid iodic acid or iodate of potassa and a drop of strong sulphuric acid, assumes, according to X. Landerer, on the application of a gentle heat, a beautiful violet color, gradually changing to red brown, remaining unchanged for many days. The thick liquid shows after a few hours a beautiful iridescence continuing for several days.—(Hirzel's Zeitschrift, xii. 86.)

Oleum cadinum is the empyreumatic oil of *Juniperus oxycedrus*, a shrub of Greece, the reddish berry-like fruits of which are of the size of gooseberries, and were formerly exported to England; the wood is odorous, and not subject to decay or the attack of insects. The empyreumatic oil is a popular remedy for chronic eruptions of the skin, psoriasis, herpes, &c., and is employed with an equal part of glycerin made into paste by starch. The fresh plant and particularly the fruit are used for making the oil. Similar is the

Empyreumatic grain oil, called sitoladon, which is prepared from wheat and other grain, by throwing it in red hot iron pans, and inverting an earthen pot over them to condense the oily vapors.—(Landerer in Hirzel's Zeitschr. xii. 89.)

Estimation of silver in the metallic state.—Fellenberg proposes to dissolve the choride of silver in ammonia, dilute with water, precipitate by a strip of bright copper, collect and wash the silver upon a filter, incinerate and fuse with borax; or to incinerate the filter containing the chloride, without fusing the latter, and reduce it by means of pure lead upon bone ashes. These processes avoid the tedious drying of the filter and the precipitates.—(Schweiz. Zeitschr. v. 121, 122.)

Ferri protochloridum is obtained pure, according to E. Amsler, by evaporating the recent solution almost to dryness, and adding powdered iron and strong muriatic acid in the proportion of 1 part of the former to 5 of the latter; the mixture is then evaporated to dryness with continued stirring by an iron spatula. The nascent hydrogen evolved will effectually reduce

all the sesqui- to the protochloride and the dry salt will keep for a considerable time. The proposed

Tinctura ferri protochloridi he advises to preserve by sugar, $\frac{1}{2}$ ounce to 1 oz. of the salt and 7 oz. of alcohol of 60 per ct. (Schweiz. Zeitschr. v. 123, 124.)

Use of glycerin.—Gros-Renaud states that glycerin of 1.200 spec. grav. dissolves between 177 and 187° F. much aniline-violet, the so-called aniline or indisine; between 133° and 144° F., whether diluted with water or not, it readily dissolves gum arabic, and the solution remains unchanged for a long time; albumen is taken up in all proportions by glycerin, diluted with an equal measure of water, between 90 and 100° F., and thus preserved for considerable time without undergoing putrefaction. (Polytechn. Centralhalle—Schweiz. Zeitschr. v. 127.)

Detection of nitric acid.—Stein proposes to heat the salt with pure protoxide of lead in a long test tube, into the orifice of which a strip of filtering paper, previously dipped into an acid solution of protosulphate of iron, has been inserted; the paper must not become too hot. A yellowish to brown color will be observed from a mixture of 1 p. saltpetre with 1000 p. glauber salt. The presence of chlorides and bin oxide of lead must be avoided. (Pharmac. Centralhalle—Schw. Zeitschr. v. 128.)

Preparation of antimoniate of potassa.—A. Reynoso prepares it by adding the solution of a salt of antimony to sufficient caustic potassa to retain the oxide in solution, which is then oxidized by the addition of permanganate of potassa, until the liquid begins to remain colored; a few drops of the alkaline solution of antimony will remove the color, and, by evaporation and cooling, crystals of antimoniate of potassa are soon obtained.—(Polyt. Notizblatt.—Schw. Zeitschr. v. 131.)

Nitric acid stains may be easily removed from the skin by sulphide of ammonium containing caustic potassa, scraping the colored portion off, and washing with water and very diluted sulphuric acid. Deadened skin, like callus, &c., may be removed in a similar manner; the hands become perfectly clean and smooth. (Pharm. Zeit. v. Bunzlau.—Schw. Zeitschr. v. 132.)

Corydalia has again been investigated by G. Leube, jun. He has likewise been unable to obtain crystallizable compounds with acids, found Müller's ultimate analysis correct, and proved the alkaloid to be anhydrous when dried at 50° C. (132° F.) The equivalent weight was calculated from the yellow precipitate with bichloride of platinum = 4720 (O = 100) and from the white precipitate with bichloride of mercury = 4672.

Its formula is $C_{46}H_{29}NO_7$, the equivalent weight 4687.5. (Wittst. V. Schr. ix. 524—527.)

Phospho-molybdate of ammonia.—E. Spiess, of Munich, and Professor V. Eggertz, of Fahlun, corroborate Nuntzinger's analysis of this compound, who calculated after drying at 212° F. the following formula: $4(H_4NO, 10MoO_3) + (H_4NO + [8MoO_3, 2PO_5]) = 3.577 NH_4O, 3.962 PO_5, 92.461 MoO_3$.—(Wittst. V. Schrift ix. 527—429.)

Fat in urine was observed by Landerer in the urine of a young man suffering from tuberculosis; it had an acid reaction. (Wittst. V. Schr. ix. 534.)

On emery.—The trade in emery is not, as formerly, monopolized by the Greek government, which now levies a tax of 5 drachms per hundred weight when exported. Other hard minerals are sometimes fraudulently substituted for it, to detect which, and to determine the value of the emery, the following method is employed in Smyrna: A plate of glass of known weight is rubbed with a certain quantity of the emery until it has no further effect; the lighter the glass has become, the better is the quality of the emery. The emery diggings of the government are on the island of Naxos. A ferruginous clay silicate has lately been discovered upon the island of Skyno, which is not inferior in hardness to emery.—(Wittst. V. Schr. ix. 535).

Estimation of nitric acid.—Fresenius dissolved a known weight of fine piano-wire in an excess of muriatic acid, contained in a retort through which hydrogen passes; the nitrate is afterwards thrown in, and after the dark color has disappeared, the amount of protoxide in the cooled solution is determined by permanganate of potassa. The quantity of peroxide is now easily calculated, and from it the amount of nitric acid by which

it had been peroxidized. (Ann. d. Chem. und Pharm. xxx. 217—219.)

The Cinchona barks of New Granada, the yellow bark of *Cinchona lancifolia*, Müt., and a green Loxa bark of *C. corymbosa*, Karst., have been studied by Dr. Karsten during his residence there. The amount of alkalies varies much, and appears to be dependant on the climate rather than on the soil. The average yield of the bark of *C. lancifolia* is $2\frac{1}{2}$ per cent. sulphate of quinia and 1 to $1\frac{1}{2}$ sulphate of cinchonia; it frequently contains no organic base, or only cinchonia, or quinia in small proportion, or it yields occasionally $4\frac{1}{2}$ per cent. of sulphate of quinia. The bark of the young branches of a tree of this species contained not a trace of organic alkaloids, while the bark of its stem yielded $1\frac{1}{2}$ per cent. sulphate of quinia and $\frac{1}{4}$ sulphate of cinchonia. Quinia appears to be a product of secretion, and to be resorbed again by the process of vegetation; a bark after the felling of a tree, yielded $3\frac{1}{2}$ per cent. sulphate of quinia, after 6 months only 3 per cent., and during this time the bark had retained its freshness on the tree. A continued uniform climate, changing with fogs, sunshine and rain, is the condition for a larger proportion of alkaloids, while a changeable climate with intermitting vegetation produces a poorer bark. (Ber. d. Berl. Akad.—Arch. d. Ph. cli. 52.)

Organic hyperoxides have been prepared by C. Brodie. Peroxide of benzoyl = $C_{14}H_5O_4$ is the result of the reaction between chloride of benzoyl and peroxide of barium, crystallizes from ether, and is decomposed above the boiling point of water with detonation, and by potassa into oxygen and benzoic acid.

Peroxide of acetyl = $C_4H_3O_4$ is yielded by anhydrous acetic acid and peroxide of barium in absolute ether; it is a tough liquid of pungent taste, decolorizes solution of indigo, oxidizes instantly protoxide of manganium, yields with baryta water peroxide of barium and acetate of baryta, and detonates violently when a drop is heated upon a watch crystal, shattering the glass to atoms. (Ann. d. Ch. und Ph. xxii. 79—83.)

Acetic acid by dry distillation of American turpentine was obtained by C. Grimm. During the first period a distillate is

obtained consisting of oil of turpentine and a layer of "turpentine water," which is colorless, light yellow to brownish red, boils between 110 and 120° C. (230 and 248° F.) and contains acetic acid. (Annal. d. Chem. und Ph. xxxi. 255, 256.)

Anhydrous oxalic acid = C_2HO_4 is according to Erdmann obtained at ordinary temperature over sulphuric acid; it is proposed by him for preparing the normal acid of volumetric analysis.—(Journ. f. prakt. Chem. lxxv. 4, 5.)

Preparation of an ethereal solution of binoxide of hydrogen.—This has been recommended by Dr. H. Storer as a test for chromic acid. Professor R. Böttger proposes the following method for preparing a solution which will keep unaltered for a long time: A piece of sodium of the size of a hazelnut, and freed from petroleum, is heated in a rather flat somewhat inclined porcelain capsule over a Bunsen gas burner to fusion, so that it ignites when stirred in contact with the air by means of an iron rod. As soon as the burning and glowing ceases, it is transferred to a well-stoppered vial. Of this impure binoxide of sodium, small particles are carried into about an ounce of very dilute sulphuric acid (1 to 24 water) contained in a narrow cylinder which is kept cool. After the third or fourth introduction, ether is added, the liquids agitated, and after separation the ether removed; this may be continued until the ethereal solution ceases to produce an intensely blue color with a diluted solution of chromic acid. With little material, a considerable quantity of this new reagent is produced in a short time. (Wittst. V. Schr. ix. 546.)

Estimation of arsenic.—A solution of pentasulphide of arsenic (AsS_5) in sulphide of ammonium yields instantly a precipitate of ammonio-arsenate of magnesia by a solution of magnesia. Lenssen states that the sulphides of tin and of antimony are not precipitated under the same conditions. (Ann. d. Chem. und Ph. —Wittst. V. Schr. ix. 574.)

Separation of phosphoric acid from sesquioxide of iron and alumina.—W. Mayer states that the requisite proportions to effect this separation, are for 1000 cub. cent. 15 grm. (1 equiv.)

tartaric acid, 6 grm. (1 equiv.) anhydrous sulphate of magnesia, and 16.5 grm. (3 equiv.) of chloride of ammonium. With other proportions, ammonia produces a precipitate containing besides ammonio-phosphate of magnesia, also basic tartrate of magnesia.—(Ann. d. Ch. und Ph. xxv. 164.)

Silicon in iron.—The black residue left after dissolving crude iron in muriatic acid, was found by Schafhäütl to evolve hydrogen with ammonia. Woehler has proved it to contain oxide of silicon.—(Ann. d. Chem. und Ph. xxviii. 374.)

Veratric acid = $C_{15}H_{10}O_8$, according to W. Merck, yields with strong nitric acid yellow nitro-veratric acid $C_{10}H_5NO_{12}$, which is soluble in water, crystallizes from alcohol and yields binitroveratric acid with more NO_2 . By heating moderately with 3 parts of baryta, veratrol = $C_{10}H_{10}O_4$ is obtained, which has an aromatic odor, crystallizes at 15° (59° F.), possesses the spec. grav. of 1.086, boils between 202 and 205° (396 to 401° F.); it yields with fuming nitric acid nitro- and binitroveratrol, and with bromine bibromoveratrol = $C_{16}H_8Br_2O_4$ —(Annal. d. Ch. und Ph. xxxii. 58—62.)

Panis lazans, or laxative cake, is prepared by painting the underside of small biscuits with an alcoholic solution of jalap-resin, and covering the place with a thin layer of a mixture consisting of beaten albumen, sugar and a little tragacanth; each cake to contain 2 gr. of resin. The dose as a mild laxative is 2 or 3 cakes for a grown person, 1 for a child from 6 to 8 years, &c.—(Pharmac. Centralhalle i. No. 12.)

Tin in vinegar.—Investigations caused by the State authorities in Potsdam have developed the fact, that pure vinegar carried in bright tin measures from the cellar to the store contained a small quantity of tin, which increased on standing and was considerable after boiling. Tin measures may probably be frequently the cause of the deleterious effects of vinegar, looked for in other circumstances.—(Arch. d. Med. Ges.—Arch. d. Pharm. cli. 115.)

Suppositories.—Dr. Pfeiffer prepares them as follows: cacao-butter or suet is fused with $\frac{1}{4}$ white wax and moulded. Im-

mediately before hardening, a tube is pressed through the base towards the middle, producing a channel which is to be filled with the medicinal substances desired, after which the aperture is closed by butter of cacao. Thus they become more active, and may be kept all ready except the filling.—(Arch. d. Pharm. cli. from Journ. des Connaiss. Méd. et Ph.

Creasotum chloroformatum.—The following or a similar mixture has long been in use in France: Creasote 1 p., chloroform and alcohol of each 2 p., by weight. (Ph. Centralhalle i. 1.)

Aqua St. Johannis.—The following mixture is employed in Southern France as a vulnerary, diminishing suppuration, and being useful in all cases where spirit of camphor and lead water is indicated: sulphate of zinc 3j., sulphate of copper ʒj., water ʒxxxvj., dissolve and add tincture of saffron ʒij., spirit of camphor ʒij., (Pharm. Cent. Halle i. No. 6.)

Glycerine in incipient dysentery is employed by Dr. Daude in the form of clysters, each composed of glycerine ʒiv. and mucilage of linseed ʒxx. At the same time, of the following mixture a tablespoonful is given every hour: glycerin ʒjss. water and orange flower water each ʒiv. (Ph. C. H. I. No. 6.)

Pomata contra varos.—Pomade for pimples, &c. Washed sulphur, tannin, concentrated bitter almond water, each 5 parts; oil of thyme, oil of bergamot, each 1 p., lard 60 p. (Ph. C. Halle i. No. 1.)

REMARKS ON THE LAW OF PENNSYLVANIA, REGULATING
THE SALE OF POISONS, INCLUDING LEGAL COMMENTS ON
THE STATUTE, BY A LAWYER.

BY CHARLES BULLOCK.

To the Editor of the American Journal of Pharmacy:—

Most druggists in our State are aware of the existence of a recent statute regulating the sale of poisons. We doubt, however, if many have carefully read the Act, or considered its bearing on their every day business.

For a better understanding of the subject, we have been kindly furnished with a copy of the Law, and some remarks on its judicial interpretation, by a member of the Philadelphia bar, and a former graduate of the Philadelphia College of Pharmacy.

The Act of Assembly in regard to the Selling of Poisons, &c., passed the 31st day of March, 1860.

[See Pamphlet Laws, 1860, page 401, §70. Also Purdon's Digest, page 1351:]

"SEC. 70.—No apothecary, druggist or other person, shall sell or dispose of, by retail, any morphia, strychnia, arsenic, prussic acid or corrosive sublimate, except upon the prescription of a physician, or on the personal application of some respectable inhabitant of full age, of the town or place in which such sale shall be made; and in all cases of such sale, the word poison shall be carefully and legibly marked or placed upon the label, package, bottle, or other vessel or thing in which such poison is contained; and when sold or disposed of, otherwise than under the prescription of a physician, the apothecary, druggist or other person selling or disposing of the same, shall note in a register, kept for that purpose, the name and residence of the person to whom such sale was made, the quantity sold, and the date of such sale; any person offending, shall be guilty of a misdemeanor, and, on conviction, be sentenced to pay a fine not exceeding fifty dollars."

Dear Sir,—In obedience to your request, I furnish you above with a copy of the section of the new criminal code, relating to the sale of poisons, &c. The report on the code says: "Its object is to prevent mistakes in the sale of noxious drugs; to throw impediments in the way of malicious and wicked persons obtaining them for murderous purposes, and to facilitate the detection of such persons, when their malignant purpose has been accomplished. The instances of murder, by poison, have recently increased to a frightful extent, both in Europe and in this country, and such legislation is demanded for the suppression of this crime." Whether this law will accomplish the objects pointed out in this report on the code, or whether the passage of any Law on the subject is beneficial, does not come within your question. As to the terms and requirements of the law and the proper method of obeying its command,—

What are these?

First. A prohibition of the sale of specified poisons, except in certain cases expressly pointed out by the law itself.

Second. The manner of marking or labeling the article containing such poison.

Third. A registration of the sale, &c.

Fourth. The grade of the offence for violating the provisions of the Act and the penalty for so doing.

I will take up the divisions of the Act in their order.

First. "*Morphia, strychnia, arsenic, prussic acid, or corrosive sublimate,*" are the only poisons named in the Act; but probably a judicial decision,

following the analogy of judicial interpretation, would include under those generic terms all the compounds into which those substances enter imparting their poisonous properties, limiting it to those only which could be used for the destruction of human life, which is the sole object the legislature proposes to prevent. To be within the Act, the sale of the forbidden poison must be by retail, that is, in small quantities, to a party standing in the position of a consumer and not a seller or manufacturer, and it matters not whether they be given or sold to improper parties, for both acts seem to be within the statute; the object of the Legislature is to prevent the poison from passing into the hands of improper parties, and not merely to prohibit a sale.

The sale or disposal by retail (small quantities to consumers) of the poisons named in the Act is absolutely prohibited, "*except upon the prescription of a physician, or on the personal application of some respectable inhabitant of full age, of the town or place in which such sale shall take place.*" To avoid the penalty of the statute, the sale must be bona fide upon the *prescription* of a physician, and I apprehend the dispenser of the poison is bound to know that it is a prescription of a physician, as it purports on its face to be, and that a mere order in the technical form of a prescription would not shield him from the penalty. In the latter part of the proviso, the sale may be "*upon personal application of some respectable inhabitant of full age, &c.*" But the application must be personal and not by order or agent, and the seller must know that the purchaser is such an "*inhabitant,*" and "*of the town or place in which such sale shall be made,*" for a sale to a stranger is not contemplated by the statute, nor is any provision made for it, and such sale would incur a penalty. The Act contemplates that the purchaser *shall be known* to the seller, that he shall be of *full age, of the town or place where the selling takes place*, and that his position and character shall be a sufficient guaranty to the seller that no improper or criminal use shall be made with the poison.

The second provision of the Act directs that "*in all cases of such sale the word poison shall be carefully and legibly marked or placed upon the label, package, bottle or other vessel or thing in which such poison is contained.*" The third provision of the Act directs, that where the poison is "*sold or disposed of otherwise than under the prescription of a physician,*" the dispenser "*shall note in a register kept for that purpose the name and residence of the person to whom such sale was made, the quantity sold and the date of such sale.*" Singularly enough he is not directly required to enter the name of the kind of poison, only the name and residence of the purchaser and the quantity and date, but the name of the kind of poison is implied from the very object for which such entry is directed to be made, to wit, to facilitate the detection of those persons who have used the poison for murderous purposes, and the entry in the register would not comply with the spirit of the law if the name of the poison should be left out. To comply with this portion of the Act, the dispenser must obtain and keep

a book solely for the purpose of making and keeping the registry as required by the act, (a memorandum would not be proper), and the dispenser must note therein the name and residence of the party receiving the poison, the kind of poison sold, the quantity thereof, and the date of such sale,—and for the safety of the seller, such entry should be made at the time of such sale, and he should see that the entry is true and accurate in all its particulars, for he is the party directed by the Act to make such entry, and upon him alone falls the punishment if the entry comes not up to the requirements of the statute; for from that book and upon the entries therein made may, perhaps, the purchase and possession of poison be traced to one charged with a criminal use of the poison; thus the register is to be made a part of the detective system of our police.

The fourth and last provision of the Act makes the violation of any of the requirements of the statute an offence of the grade of a misdemeanor, and expressly provides a punishment, to wit, a fine not to exceed fifty dollars for violating the Act, either in disobeying the prohibition or for not complying with its requirements in regard to the sale of the poisons; which would be carried into effect by an indictment for the offence and a conviction in the Court of Quarter Sessions of the County where the offence was committed; and such conviction would subject the party defendant to the payment of all costs in addition to the fine directed by the Act. Whether a civil suit could be maintained by a party injured, for damages resulting from the wrongful sale or disposal of the poisons named in the Act, does not come within the scope of your inquiry.

Yours respectfully,

C. T. BONSALE.

Whether judicial restraint on the sale of poisons, in the shape of a law such as the present, will promote the object most to be desired, viz: Security against the malicious or careless use of poisons, is a question which has engaged the attention of our own as well as the medical profession.

The several Colleges of Pharmacy and the American Pharmaceutical Association have labored with the subject for years, with the laudable desire to afford some protection to the public against the indiscriminate sale of noxious drugs and chemicals. As yet they have not felt prepared to recommend a law of the kind enacted by our Legislature, as affording the security to be desired.

So long as the sale of such articles is left open to free competition, without any restraint as to the qualification and character of the druggist, the law will by many be regarded as an impediment to trade, and fall short of protecting the community

from the more numerous cases of poisoning which result from accident and carelessness.

A law on the subject should be one to which every conscientious druggist and chemist can give his support, without finding it necessary to infringe either its spirit or letter.

Can he do so with the present law? We are informed that the dispensing druggist must know that a prescription calling for Solution of Morphia, Fowler's Solution, &c., is written by a graduate of some incorporated medical school; the usual form, carrying with it all the usually accepted guarantee of a physician's prescription, is, we are told, not sufficient; the dispenser must be able to identify the writing of the prescriber so certainly as to be willing to risk the consequences of a misplaced judgment.

Again—what constitutes the standard of *respectability*? The law does not require the applicant to be *personally known*, only *respectable*, of full age, and a resident of the place where the sale is made. On this *questionable* security the dispenser is allowed to dispose of noxious articles, while he is forbidden to supply the same to the chemical department of a school or college on the *written order* of a well known and responsible teacher or professor.

As the law does not define the meaning of *retail*, to which department it limits its restrictions, the seller must use his judgment; if he *wholesales* poisons to *even improper persons*, he is guiltless of violating the letter of the law.

The requirements regarding labeling and registration are salutary, and have been customary in well regulated stores.

The act seems directed chiefly to the sale of poisons for criminal purposes, and we wonder why many potent and deleterious substances, now common, should have escaped notice.

The best protection to the community against the indiscriminate sale of poisons, is the *character* and *judgment* of the dispenser. So long as any one who places a bottle of colored water in his window, and a sign over his door, is considered a responsible judge of *respectability*, and the difference between *retail* and *wholesale*, we will have arsenic and corrosive sublimate sold to any one who has money to pay for it.

Philada. Feb. 20, 1861.

CHARLES BULLOCK.

ON THE PREPARATION OF CITRATE OF MAGNESIA.

BY WILLIAM J. WATSON.

Editor of the American Journal of Pharmacy :

DEAR SIR,—In the preparation of Citrate of Magnesia by the formula of the Pharmacopœia, I have always failed to obtain a permanent solution ; and all the druggists whom I have consulted give the same report.

The following formula, which I have adopted and by which I have prepared the citrate for about two years, gives a preparation which, though not so active as the solution of the Pharmacopœia, acts thoroughly as a purgative when the contents of a bottle are taken fasting, is pleasantly acid, contains a large quantity of carbonic acid gas, and does not produce griping, as the solution containing Bicarbonate of Potassæ is said to do ; and will, if tightly corked, remain without change or deposit for an indefinite time.

Acid Citric,
Magnesia Carb. (The form known as small squares.)
Syr. Simplex,
Ol. Limonis,
Aqua, *aa* q. s.

Take six twelve ounce citrate bottles, (to each of which has been fitted a good velvet cork, previously macerated in boiling water for half an hour), add to each bottle Ol. Limonis gtt.j, Syr. Simplex \mathfrak{z} iss. ; weigh out six separate portions of Acid Citric, \mathfrak{z} iv. each, six of Magnesia Carb., \mathfrak{z} ij. each, and six of Acid Citric, \mathfrak{z} ij. each ; put into a mortar one of the portions of Magnesia Carb. and one of the \mathfrak{z} iv. portions of Acid Citric, rub together with sufficient water (about six ounces) to make a smooth mixture, and add to one of the bottles, proceed in the same manner with the remainder ; (commencing with the first bottle to which the solution was added,) add one of the \mathfrak{z} ij. portions of Citric Acid to each, fill up with Aqua, cork and tie down, place the bottle on its side for half an hour, shaking occasionally.

By this process the solution of Citrate of Magnesia is not filtered, and to insure a handsome preparation the water should

be perfectly clear, and the Magnesia and Citric Acid free from all insoluble matter.

I hope that the publication of this formula will prove of service to those who have heretofore been disappointed in the preparation of this article.

Very respectfully,

WILLIAM J. WATSON.

Brooklyn, N. Y., Feb. 18, 1861.

ON THE ALKALOID AND OTHER CONSTITUENTS OF COCA LEAVES.

By DR. ALBERT NIEMANN, of Goslar.

The inaugural dissertation of the author is published in Wittstein's V. Schrift. ix. 489-524; it contains many interesting facts, but is too lengthy for translation; we therefore give in the following a condensed account of it.

After discussing the importance of the vegetable alkaloids in a medicinal point of view, and for the examination of crude drugs, the author disapproves of such incomplete investigations as enrich our knowledge with nothing else but names, and then considers the interest attached to those stimulating vegetables, denominated by von Bibra, "narcotic victuals," like coffee, tea, cacao and tobacco; the coca leaves are employed for similar purposes by the natives of Peru and Bolivia.

The Austrian frigate Novara brought from Lima a quantity of good coca leaves, which Professor Woehler handed to the author for investigation.

After treating at length of the botanical characteristics of the order Erythroxylaceæ, which comprises only the genus Erythroxylon, and its geographical extension, he gives a minute description of *E. coca*, its culture and the use and properties of its leaves, referring to the observations and opinions of von Martius, Poeppig, von Tschudi, Weddell and Scherzer, some of whom have advocated the introduction of the coca into the European navies and armies on account of its well known qualities to preserve life and strength for a considerable time without food.

The author reviews the various incomplete investigations of

Wackenroder, Johnston, Gaedcke, and MacLagan, and states that the alkaloid prepared by Pizzi of La Paz, and brought by Tschudi to Europe, was analyzed by him and found to be gypsum.

The following is the author's process for preparing the alkaloid which he proposes to name *cocaina*. The leaves are exhausted with 85 per ct. alcohol containing $\frac{1}{50}$ sulphuric acid, the tincture treated with milk of lime, the filtrate neutralized with sulphuric acid, and the alcohol regained from the filtrate by distillation. The syrupy residue is treated with water to separate resin, the liquid is precipitated by carbonate of soda, when an odor reminding of nicotia is emitted, and the alkaloid is exhausted by repeated agitation with ether, distilling off most of the ether, and evaporating the balance spontaneously. The yield is about $\frac{1}{4}$ per ct. of crude *cocaina*, consisting of colorless crystals mechanically mixed with a yellowish brown matter of a disagreeable almost narcotic odor, which cannot be removed by animal charcoal or recrystallization, but may be separated by washing with cold alcohol. Less loss is sustained if the ethereal solution is agitated with diluted sulphuric acid, the aqueous solution of the sulphate precipitated by carbonate of soda and the precipitate freed from the last traces of coloring matter by alcohol. The alkaloid crystallizes best on evaporating spontaneously an alcoholic solution previously diluted with water.

Pure *cocaina* is in colorless transparent, rather large prisms, inodorous, soluble in 704 parts water at 12° C. (53.6° F.), more in alcohol, freely in ether. The solutions have an alkaline reaction, a bitterish taste, promote the flow of the saliva, and leave upon the tongue a peculiar numbness, followed by a sensation of cold. The crystals fuse at 98° C. (208° F.) and congeal again to a transparent mass, which gradually assumes a crystalline structure. Heated above its fusing point, it becomes colored, and is decomposed; it runs up the sides of the vessel, and it is uncertain yet whether a small portion will sublime unaltered. It fuses upon platinum foil, and burns with a bright flame, leaving a charcoal, burning with some difficulty.

No physiological experiments have as yet been made with it.

The alkaloid is readily soluble in all diluted acids, forming salts which are of a more intensely bitter taste than uncombined *cocaina*. It absorbs dry hydrochloric acid gas, fuses and congeals

to a greyish white transparent mass which crystallizes after some days; the solution crystallizes in long, tender, radiating crystals. The sulphate and nitrate dry to an amorphous colorless mass, which gradually changes to crystals, the latter with great difficulty. The acetate readily assumes the form of a crystalline, sometimes herbaceous, looking mass.

The following is the behaviour of a diluted solution of the hydrochlorate to reagents:

Fixed alkalis: a white precipitate, slowly soluble in a large excess.

Ammonia and carbonate of ammonia: the same precipitate, readily soluble in excess.

Carbonate of soda: white precipitate, insoluble in excess, becoming crystalline.

Sulphocyanide of potassium: a slight turbidity.

Protochloride of tin: a white curdy precipitate, soluble in much nitric acid.

Nitropicric acid: a pulverulent sulphur-yellow precipitate, becoming resinous.

Terchloride of gold, even in the most diluted solutions: a voluminous light yellow precipitate, becoming flocculent, soluble in the heated mother-liquor and crystallizing on cooling in beautiful yellow scales, resembling iodoform; it crystallizes from hot alcohol in golden yellow scales or in a dense granular powder.

Bichloride of platinum: a dirty greyish yellow precipitate, becoming crystalline, soluble on heating, scarcely soluble in muriatic acid.

Tannin: a very slight turbidity; in the presence of muriatic acid a voluminous pearly white precipitate, shrinking and becoming resinous in appearance.

Bichloride of mercury: a voluminous, soon flocculent precipitate, soluble in muriatic acid and in chloride of ammonia. It does not crystallize from its solution in alcohol.

Iodo-hydrargyrate of potassium: a curdy white precipitate, soluble in muriatic acid and chloride of ammonium.

Molybdate of ammonia in the most dilute solutions: a voluminous yellowish white precipitate.

Iodine: a kermes brown precipitate.

Iodide of potassium: scarcely a faint turbidity; when con-

taining iodine a strong brownish red precipitate, which darkens gradually.

Tincture of iodine, no turbidity in the alcoholic solution of cocaina. No reactions were obtained with phosphate of soda, bicarbonate of potassa, tartar emetic, acetate and subacetate of lead, sesquichloride of iron, and iodic acid.

Cocaina is dissolved by fuming nitric and by concentrated nitric, hydrochloric and sulphuric acids without coloration; when heated, only the latter darkens and ultimately blackens it. A characteristic test with oxidizing agents has not been observed. In its chemical and also physical properties, it resembles atropia to some extent.

The atomic weight of the alkaloid was determined from the double salt with chloride of gold, and was found from the amorphous compound = 283, crystallized from hot water = 280, crystallized from alcohol = 288. On heating the dry double salt, a sublimation of benzoic acid took place, the first observation of the kind of any known alkaloid. Ultimate analysis showed the following composition:

Calculation.				
C 66.8	66.8	C 32	192	66.20
H 7.1	7.5	H 20	20	6.90
N 5.4	5.4	N	14	4.83
O 20.7	20.3	O 8	64	22.07
100.0	100.0	$C_{32}H_{20}NO_8$	290	100.00

Vegetable wax from coca leaves. The precipitate occasioned by milk of lime in the alcoholic tincture was treated with cold ether, which on evaporation left a soft sticky brown mass, wholly soluble in boiling alcohol, from which, on cooling, a white body was separated, appearing after repeated solution in hot alcohol as a snow-white granular mass. It fuses at 70° C. (167° F.), is slowly soluble in hot alcohol, readily in ether, and is not acted on by solutions of alkalis or acids. By elementary analysis 80.2 C., 13.4 H. and 6.4 O. were obtained, which leads to the empirical formula, $C_{66}H_{66}O_4$. The composition of this body, called coca wax by the author, closely corresponds with that of Mulder's grass wax and syringa wax.

Coccatannic acid. After precipitating the cocaina by carbonate of soda as above, the dark red filtrate is freed from ether, neutralized by nitric acid, the sulphuric acid removed by nitrate of baryta, the excess of the latter by carbonate of ammonia, and the liquid neutralized by nitric acid; acetate of lead now produced a voluminous dirty brownish green precipitate, which was decomposed by sulphuretted hydrogen, and yielded a clear yellowish red solution of slightly astringent taste, reddening litmus and giving the following reactions: Alkalies and their carbonates, a deep red color; sesquichloride of iron, a dark brownish yellow color; glue and bichloride of mercury, no turbidity; the nitrates of mercury, dirty yellow precipitates, soluble in acids; tartar emetic, a flocculent, brownish yellow precipitate; albumen, dirty yellow; acetate of baryta and lead, dirty yellow, soluble in acetic acid; terchloride of gold, dark brown precipitate, soon after a mirror of metallic gold; nitrate of silver, a turbidity, on heating a dirty yellow precipitate, afterwards a dark brown powder; hydrochlorate of cocaina, no turbidity. The tannin solution reduced chromate of potassa, and on boiling, also, Fehling's solution of copper; it dried on evaporation to a transparent brownish red mass, containing some inorganic matter.

The filtrate from the precipitate with acetate of lead, yielded with subacetate of lead a yolk yellow precipitate, apparently containing the same tannin partly modified through the influence of the nitric acid.

Odorous principle. On distilling 100 grm. of the leaves, a slightly turbid distillate was obtained, which, on redistilling it with chloride of sodium, yielded white globular masses, lighter than water and possessing the peculiar tea-like strong odor of the leaves; the quantity was insufficient for further analysis.

J. M. M.

ON THE DETECTION OF PHOSPHORUS IN CASES OF POISONING.

By DR. C. HERZOG.

The author has made experiments with the various methods suggested, and refers particularly to Mitscherlich's process and some slight modifications of it; he then continues: But if thus no phosphorus could be discovered in a corpse, the possibility of poisoning by it is not excluded; we can imagine that it may have

remained long enough in the body before death occurred, to become oxidized into phosphorous acid; this may even be possible in a corpse which has been interred for some time.

The substance is, if necessary, rendered sufficiently liquid with water, and without the addition of an acid is distilled from a flask connected with Mitscherlich's apparatus. The most minute quantity of free phosphorus will evidence itself by the peculiar vapors and the characteristic lumination in the dark. If this is not observed, and there exists the suspicion of poisoning by phosphorus, the reaction of the liquid to litmus is observed. In case of an alkaline, neutral or very slight acid reaction, no further investigation for phosphorus is advisable.

In case of a strong acid reaction, the substance is mixed with an equal volume of alcohol, which coagulates albuminous bodies and dissolves but little fat. After a short time it is filtered, the residue washed with weak alcohol, and the filtrate evaporated to a syrupy consistence, when it is to be mixed with at least three times its volume of absolute alcohol. The filtrate is evaporated and the operation repeated twice.

The residue when dissolved in water is neither precipitated by ammonia nor oxalate of potassa, even though phosphate of lime had been intentionally added at the beginning; it is well to become satisfied of the absence of these reactions. To one half of the solution, some zinc and dilute sulphuric acid is added, and the gas conducted into a solution of silver, from which a reduction of silver by phosphuretted hydrogen will take place, if phosphorous acid had been present. The gas will burn with a greenish flame, as was observed by Duflos, without producing a deposit upon porcelain.

The other half is mixed with a few drops of nitric acid, neutralized with pure carbonate of soda, evaporated and heated to redness to destroy fatty acids, then dissolved in water, neutralized and tested for phosphoric acid, when it must not be left out of view that possibly only pyrophosphoric acid may be present. It is not advisable to test before the evaporation for phosphorous acid, because similar reactions may occur with the fatty acids.

The above experiments control one another; if all the reactions take place, we may conclude on the poisoning by phosphorus. (*Arch. d. Pharm.* cli. 138—141.) J. M. M.

QUINIC ACID IN THE LEAVES OF THE VACCINIUM MYRTILLUS.

Zwenger says he has found quinic acid in the leaves of the *Vaccinium Myrtillus*. His process for extracting it is the following: He boils the leaves (collected in May) with milk of lime, and precipitates the clear solution with alcohol. The precipitate he dissolves in water, adds a little acetic acid, and the neutral acetate of lead to throw down the coloring and other foreign matters. After having removed the lead by sulphuretted hydrogen he evaporates the liquor to a syrupy consistence, and then sets it aside for some days, when quinate of lime is deposited. This he dissolves in water, adds sulphuric acid to take away the lime, and evaporates in a water bath. The syrupy residue he dissolves in alcohol, and in this solution there forms sometimes oblique prismatic crystals which possess all the characters of quinic acid.—*Ann. der Chem. und Pharm. from Chem. News, London, Oct. 6, 1860.*

A MALLEABLE AMALGAM FOR DENTISTS.

As to the brittleness which cadmium is said to communicate when combined with any other metal, the facts are, *some* of its alloys, even with malleable metals, *are* "brittle." But others are highly tenacious and malleable. Its alloys with gold, platinum and copper afford instances of the former. Its combinations with lead, tin, and to a certain extent with silver and mercury, are examples of the latter. An alloy of two parts silver and one of cadmium is perfectly malleable and very hard and strong; with equal parts of each it is also malleable, but possesses less tenacity; but when mixed in the proportions of two parts of cadmium and one part of silver it is brittle. Equal parts of cadmium and mercury form a tough and highly malleable composition; in the proportion of two parts of the latter to one of the former, the amalgam is nearly equal in malleability, but possesses less strength. These mixtures are remarkable in view of the fact that most amalgams are exceedingly frail and brittle. A mixture of two or three parts of tin with one part of mercury is so fragile as almost to drop to pieces in handling; the amalgams with lead, bismuth, &c. are similar.—*Chem. News, London, Sept. 29, 1860.*

ON THE PREPARATION OF ARTIFICIAL COLORING MATTERS
WITH THE PRODUCTS EXTRACTED FROM COAL TAR.

BY M. E. KOPP.

(Continued from page 47.)

EXTRACTION OF ANILINE FROM COAL TAR.—The method which appears to be the most rational, and which deserves to be tried, would consist in treating the tar as condensed in gas works, with hydrochloric or sulphuric acid, diluted with 3 or 4 times its volume of water. Mechanical means for affecting the intimate mixture of the tar with the acid might be easily contrived, but in the absence of any special contrivance, the end may be attained by half filling a barrel with the tar, adding one-fifth or one-sixth its volume of acid, and rolling and shaking the barrel until the acid has taken up all the bodies with which it is able to combine; the whole might then be run into a cistern, where by degrees the watery liquid would separate from the tar. The same acid liquid might be used over and over again, until the bases had nearly saturated the acid. A very impure aqueous solution would thus be obtained, but containing the hydrochlorates or sulphates of ammonia, and all the other organic bases contained in the tar, such as aniline, quinoline, pyrrol, picoline, pyrrhidine, lutidine, toluidine, cumidine, &c. By evaporating this solution almost to dryness, and then distilling with an excess of milk of lime, the bases would be set at liberty. Ammonia, as the most volatile, would be disengaged first, and might be condensed apart, and by raising the temperature higher and higher the other bases would be disengaged. Aniline would be found among the liquids distilling between 150° and 250° C.

The manipulation of the tar, however, is an extremely disagreeable operation, and presents many difficulties; it is therefore preferable, in most cases, to distil the tar first, and only operate on the most pure and limpid distilled oils.

Aniline, because of its high boiling-point, is never met with in the light and volatile liquids which first distil from tar. The most of it is found in those which distil between 150° and 230° C. These, according to Hofmann contain about 10 per cent. of organic bases, mostly aniline and quinoline. The oils which

distil above 250° contain mostly quinoline, and very little aniline.

The following is Hofmann's process for extracting the two bases from the oils and separating them. The oil is agitated strongly with commercial hydrochloric acid. The mixture is then allowed to rest for 12 or 14 hours, and the oil is separated from the acid; the latter is treated again with fresh quantities of oil until it is nearly saturated. The still acid solution of the hydrochlorates is filtered through linen or wetted filtering paper, to retain the greater part of the oil mechanically mixed with the watery solution; it is then placed in a copper still, and supersaturated with an excess of milk of lime. At the moment of saturation an abundance of vapors are given off, and the head must be quickly fixed on the still. Heat is now applied, so as to obtain a quick and regular ebullition.

The condensed product is a milky liquid, with oily drops floating on it. The distillation is carried on as long as the vapor has the peculiar odor of the first part distilled, or the condensed product gives the characteristic reaction of aniline with chloride of lime.

The milky liquid is now saturated with hydrochloric acid; it is then concentrated in a water bath; and lastly, decomposed in a tall narrow vessel by means of a slight excess of hydrate of potash or soda. The bases set free, unite, and form an oily liquid, which floats on the alkaline solution. This is removed with a pipette and rectified. The rectified product is aniline, sufficiently pure for industrial purposes, especially if we set aside the part distilling above 200° or 220° , which is principally composed of quinoline.

To obtain aniline chemically pure, the neutral oils forming part of the oily layer must be completely removed. This is done by dissolving the whole in ether, and adding dilute hydrochloric or sulphuric acid, which combines with and separates the bases, and leaves the oils in solution in the ether. The acid solution is then decanted, decomposed with potash, and submitted to careful fractional distillation. If the products are gathered separately in three parts, the first will contain ammonia, water, and some aniline; the second will be pure aniline; while the third portion will contain mostly quinoline. An alcoholic solu-

tion of oxalic acid is now added to the impure aniline, which precipitates oxalate of aniline, as a mass of white crystals, which are washed with alcohol, and then pressed. The salt is then dissolved in a small quantity of water, to which a little alcohol is added. From this solution the oxalate crystallises in stellated groups of oblique rhomboidal prisms. These crystals are decomposed by a caustic alkali, to set free the aniline, and when this is distilled, water at first passes, then water charged with aniline, and lastly, at 182° C. chemically pure aniline.

ARTIFICIAL PREPARATION OF ANILINE BY THE REDUCTION OF NITRO-BENZOLE.—This process, which constitute some of the most curious and important reactions of organic chemistry, allows us to obtain aniline in any quantity. It is not difficult to prepare, but certain precautions are necessary when operating on a large scale.

The process may be subdivided into three distinct operations.

1. *Preparation of Benzole.*
2. *Transformation into Nitro-benzole.*
3. *Reduction of Nitro-benzole to form Aniline.*

1. *Preparation of Benzole.*—The only process we have space to notice is that by which benzole is obtained on a large scale, viz.—the extraction from coal-tar, or from the first products of the distillation of coal-tar, light oil, or crude naphtha.

The manufacturer who wishes to distil tar in order to procure the largest amount of benzole, should choose a light fluid tar, and preferably one distilled from bog head or cannel coal. To form a comparative estimate of the value of different tars, the following experiment may be performed:—About 20 pints of the tar are distilled until the vapors, instead of condensing into a liquid, furnish a product which, on cooling, becomes solid, or of a buttery consistence. By carefully observing when the condensed oil becomes heavier than the water, and measuring the volume of the lighter oils which float on the surface of the water, and then comparing the volumes, we are enabled to estimate with tolerable accuracy the value of the tar. Of course that which yields the largest amount of light oil is the best.

Some account of the process of distillation was given at pages

39 to 47 of this volume, to which we refer the reader, and also to the paper by Mr. Mansfield, in the *Quarterly Journal of the Chemical Society*, i. p. 244.

Crude naphtha, or the benzole of commerce, is generally a yellow or brown liquid, having a density varying from .09 to .95; it usually contains, besides benzole, some of the homologues of benzole, toluol, cumol, and cymol. It is impossible to separate these bodies by an ordinary process of rectification; for although the boiling point of toluol is 108° or 109° , and that of cumol 143° or 145° , their vapors are, so to say, dissolved in the vapor of benzole, and are carried over and condense together. Their presence, however, need not interfere with the preparation of nitro-benzole and aniline.

The benzole found in commerce is at times very impure; some, indeed, has been met with containing but a trace of real benzole. Such an article is generally the result of the distillation of bituminous schists or asphaltum; and, besides hydrocarbons belonging to another series than that of benzole, it generally contains a small amount of oxygenated products, and consequently cannot be advantageously used in the preparation of aniline. It is therefore important to be able readily to detect benzole in a mixture of other oils. For this purpose we may avail ourselves of the facility with which true benzole is converted into nitro-benzole and then into aniline by the action of nascent hydrogen.

The following is Hoffmann's method:—A drop of benzole is heated in a small test tube, with fuming nitric acid, to convert it into nitro-benzole. A good deal of water is then added, to precipitate the nitro-benzole in small drops, which must be taken up by ether. The ethereal solution is then poured into another small tube, and equal volumes of alcohol and dilute hydrochloric acid are added; a few fragments of granulated zinc are then dropped in. In about five minutes sufficient hydrogen will have been disengaged to produce aniline, which will be found combined with the acid. The liquid is supersaturated with an alkali and shaken with ether, which dissolves the aniline set free. A drop of this ethereal solution allowed to evaporate on a watch glass, and mixed after the evaporation of the ether with a drop of a solution of hypochlorite of lime, will show the violet tints

which characterise aniline. The operations may be executed very rapidly, and without any difficulty.

PROPERTIES OF BENZOLE.—At the ordinary temperature benzole is seen in the form of a colorless very fluid liquid, of an agreeable (?) odor, and having the specific gravity .85° at 15° C. At a very low temperature it crystallises or forms a mass like camphor, which melts at 5°. Its boiling-point is between 80° and 81°, and it distils without undergoing any change. It is nearly insoluble in water, to which, however, it imparts its peculiar odor; it is very soluble in wood-spirit, ether, alcohol, the essential and the fatty oils; and it easily dissolves camphor, wax, fatty matters, india-rubber, gutta-percha, and a great number of resins. Among the last, those which are least soluble in it are shellac, copal, and animi. It is very inflammable, and burns with a brilliant smoky flame. Hydrogen gas passed through it, and charged with its vapor, burns with a very clear, luminous flame.

Chlorine and bromine convert benzole into the terchloride and terbromide of benzole. In direct solar light the change takes place very quickly. Concentrated sulphuric acid dissolves benzole, and when the mixture is gently heated, a copulated acid, sulpho-benzylic acid, is formed, $C_{12}H_6S_2O_6$, the hydrogen of which may be replaced by metals. As this acid is soluble in water, we see that in purifying rough benzole with sulphuric acid it is necessary to avoid using an excess of the acid, and also heating the mixture. A solution of chromic acid does not act on benzole, and is therefore a good agent for the purification. Concentrated nitric acid converts benzole into nitro-benzole, to the manufacture of which we next proceed.

PREPARATION OF NITRO-BENZOLE.—The preparation of nitro-benzole is accomplished, on the large scale, by allowing a fine stream of benzole, and another of the strongest nitric acid to run together in a worm or long glass tube kept well cooled. The two liquids react on each other on coming in contact, heat is disengaged, and nitro-benzole is formed. Commercial nitric acid mixed with half its volume of sulphuric acid may be substituted for the concentrated nitric acid. The nitro-benzole

collected at the end of the worm, is first washed with water, then with a solution of carbonate of soda, and afterwards once again with water.

Nitro-benzole is a yellowish liquid which at 15° C. has the sp. gr. 1.209. It boils at 213° , and cooled to 3° it crystallises in needles. Having an odour closely resembling that of the essential oil of bitter almonds, it has been largely used in perfumery for scenting fancy soaps, for which purpose it has one advantage over the oil of bitter almonds—it is less affected by the action of alkalis. It is almost insoluble in water, but is very soluble in alcohol, ether, and the essential oils. Concentrated nitric and sulphuric acid dissolve it, but it is precipitated on the addition of water. It is decomposed by continued boiling with concentrated sulphuric acid; and under the same circumstances with concentrated nitric acid it forms binitro-benzole. Neither the alkalis in strong aqueous solution, nor quick lime act on nitro-benzole; but an alcoholic solution of the alkalis act energetically and form azoxybenzole ($C_{10}H_7N_2O_2$). By the action of nitric acid on this last substance a number of other interesting bodies are produced, which, however, it is not necessary now to describe.

TRANSFORMATION OF NITRO-BENZOLE INTO ANILINE.—This is effected by a variety of processes which we shall proceed to describe in detail.

1. *By means of sulphide of ammonium.* An alcoholic solution of nitro-benzole after having been saturated with ammoniacal gas is treated with a current of sulphuretted hydrogen. The liquor now becomes of a deep dirty green color, and deposits a little sulphur. It is now left for twenty-four hours, during which time crystals of sulphur are deposited, the odour of sulphuretted hydrogen disappears, and is replaced by a strongly ammoniacal smell. If distilled now to recover the alcohol, a good deal of sulphur is deposited, and it is impossible to continue the distillation long, because of the violent bumping which ensues. It is therefore allowed to cool and the sulphur is removed. On distilling the liquor again more sulphur is deposited, which must also be removed. The process must be continued, re-saturating the liquor with sulphuretted hydrogen

if need be, until a heavy oily matter (aniline) deposits, which must be separated from the liquor and re-distilled by itself. The aniline is thus obtained nearly pure.

Instead of using an alcoholic solution of nitro-benzole, and treating it successively with ammonia and sulphuretted hydrogen the alcoholic solution of sulphide of ammonium may be prepared beforehand, and the nitro-benzole poured into it. A part is dissolved immediately, and the remainder by dryness in the course of the operation. It is sometimes advantageous, instead of waiting until the aniline separates, to add hydrochloric acid to the liquor in the retort until it is slightly acid, and then to distil almost to dryness, by which means chloride of aniline is obtained. This is decomposed by an excess of caustic soda, and the aniline set at liberty is distilled off.

To avoid any danger from the bumping a tinned copper still must be used, which should be heated by steam under a light pressure. At first the temperature should not exceed 90°C . but after some time it may be raised to 100° or 110° .

The ammoniacal alcohol condensed in the worm may be re-saturated with the sulphuretted hydrogen, and used over again with a new quantity of the nitro-benzole.

2. *Reduction of the nitro-benzole by nascent hydrogen.* In preparing aniline by this process the nitro-benzole and zinc are placed in a vessel and dilute sulphuric or hydrochloric acid is added so as to produce the disengagement of a small quantity of hydrogen. By degrees the nitro-benzole disappears and aniline is formed, which remains in solution in hydrochloric or sulphuric acid. To isolate it, an excess of caustic soda is added and the mixture is distilled, on which the aniline passes over with the vapor of water.

Bechamp first recommended the employment of acetic acid and iron filings. He places in a retort one part of nitro-benzole, one and a half parts of iron filings, and one part of concentrated acetic acid. The reaction takes place without the application of external heat, the mixture becoming hot by itself, and the vapor being condensed in a receiver, which must be kept well cooled. The condensed products consist of aniline, acetate of aniline, and some unchanged nitro-benzole. These are allowed to cool and are then returned to the retort and

again distilled to dryness. The distillate is now treated with potassa fusa, and the aniline separates as an oily layer, which must be removed and distilled once more.

The residue of the mixture of iron filings, acetic acid and nitro-benzole, which remains in the retort after the distillation, still contains a considerable amount of aniline. To obtain this the retort must be washed out with water acidulated with sulphuric or hydrochloric acid and the solution filtered, and then evaporated to dryness. The dry residue is then mixed with quick lime, and placed in a retort of iron or refractory ware and distilled; and the aniline thus obtained must be rectified.—*Chem. News, London, Oct. 1860.*

ON THE PRODUCTION OF CONIUM SEEDS IN THE UNITED STATES.

By HENRY F. FISH, of Waterbury, Conn.

To the question, "Can the seeds of *Conium maculatum* be collected in quantity sufficient for the preparation of Coniūn, (or Conia,) as an article of commerce?" I reply, that on the first day of October, 1859, I addressed printed circulars, embodying a series of inquiries, to a large number of individuals in my own, as well as in other States, and that, to them, I have received only one reply of any practical value.

The questions and their answers are now presented:—

Question 1st, Does *Conium maculatum* grow in your locality?

Answer—We raise it.

Question 2d, In what quantity? Answer—1200 to 2000 pounds to the acre.

Question 3d, Is any use made of it? Answer—A large amount of Extract is made.

Question 4th, How many pounds of ripe seeds can be obtained? Answer—100 pounds to the acre.

Question 5th, At what probable cost by pound? Answer—From 25 to 33 cents.

Question 6th, Can you engage in their collection? Answer—If any demand was made, we would do so.

Answer returned by Charles T. Carney, of Boston; informa-

tion communicated by S. T. Atherton, South Groton, Middlesex county, Massachusetts.

I may add, that *Conium maculatum* grows wild, abundantly and luxuriantly, in many towns in the State of Connecticut; in some places so thick, in patches, as to be mown down with a scythe. Judging from the fact that it is regarded as a pest rather than otherwise, on account of its abundance, its poisonous properties and its tenacity of life, I have no reasonable doubt but that many hundreds of pounds of ripe seeds may be procured this fall, within a radius of thirty miles of my own locality, and that any demand arising for it would bring into market within a twelve-month, an abundant supply.

I will pursue the subject farther if deemed necessary.—*Proc. Amer. Pharm. Asso.*, 1860.

ON THE RELATIVE VALUES OF SOCOTRINE AND BARBADOES ALOES.

By MR. RICHARD W. GILES.

The therapeutic importance of aloes may be inferred from the circumstance that there is no purgative pill in our present Pharmacopœia into the composition of which it does not enter. It constituted more than 50 per cent. of the compound extract of colocynth P. L. 1836, and is besides a chief ingredient in the pill popularly known to the humbler classes as "*Pil. Coccinæ*." In any other form than that of a pill it might have been supposed that its extremely nauseous taste would have prevented its administration, yet we find the compound decoction is in great demand both as a pharmacopœial preparation and as an old-fashioned domestic medicine, with many modifications, under the name of "*Baume de Vie*."

In the Pharmacopœia of 1851 (for the first time, I believe), Barbadoes aloes finds a place, but its employment is only directed in one instance—*Pil Aloës c. Sapone*,—on account of which it is probable that it was exclusively introduced. It would seem to be by inadvertence that it is permitted *sub silentio* in the *Enema Aloës*. The inquiry to which I desire to direct the attention of the Society is, whether the comparative value of the two descriptions of aloes, viz. Barbadoes and Socotrine

(including Hepatic), is fairly represented by the positions they respectively occupy in our Pharmacopœia. In my opinion it is *not* fairly represented, but, on the contrary, so far as my observation goes, the Barbadoes is a better description of aloes for medical purposes, acting in a preferable manner as a purgative to the Socotrine. This opinion has been held by some medical practitioners, including apparently the late Dr. Marshall Hall, from whose original and favourite formula known as Pil. Aloës Diluta, our Pharmacopœia has borrowed the directions for the preparation already spoken of under the name of Pil. Aloës c. Sapone.

It is well known that many patients have a strong objection to the use of ordinary aloes, and we must all have noticed the solicitude manifested by such persons to have their prescriptions dispensed with the veritable aqueous extract instead of the crude drug. Now it is worthy of remark that the per-centage of aqueous extract in Socotrine aloes is about 56, and in Barbadoes about 80; and it almost follows that if the aqueous extract is really preferable in its operation, according to the concurrent belief of the faculty and their patients, *that* description of aloes must be the best which contains the largest proportion of aqueous extract.

But in addition to this, Messrs. Smith of Edinburgh by their discovery of aloin, seem to me to have supplied a further *a priori* argument in favor of Barbadoes aloes. From their experiments (*Ph. Journal*, vol. xi., p. 23) it appears that aloin is at all events obtained with greater facility from Barbadoes aloes than from any other description; and although the contradictory statements which have been published with reference to this substance are somewhat perplexing, we may safely conclude that the purgative properties of aloes are due to it in part, if not wholly, and that the facility with which it is obtained from the Barbadoes variety, indicates its abundant presence in a condition unaltered by the process of inspissation, which cannot be said with equal confidence of Socotrine aloes. (*Vide* Dr. Pereira's paper on Aloe Juice, *Ph. Journal*, xi., 439.)

The favorable estimate of Barbadoes aloes, deducible from its relation both to the aqueous extract and to aloin as above described, has been confirmed by my own experience, for after

arriving at the conclusion that the Barbadoes was medicinally the best kind, I began by substituting it for Socotrine in the compound rhubarb pill prepared for retail purposes, and since that time have so constantly heard that the pills thus made are preferred to others, that it is impossible to resist the conviction that there is a very marked superiority in the action of Barbadoes as compared with Socotrine aloes. More recently I have carried the substitution a step further, by employing the aqueous extract instead of the crude aloes; but, although I am still inclined to recommend this second change, as rendering the improvement more complete, I cannot say that it has produced equally marked results, and I am only more strongly convinced that the advantages which have been stated are special attributes of the Barbadoes variety of aloes.

I will only add to these remarks an extract from Pereira's *Materia Medica* bearing on the subject. Comparing the varieties of aloes, he says, "Socotrine aloes has long been regarded as the best kind of aloes, though its commercial value is now below that of Barbadoes. It is, I suspect, inferior in activity." (Per., *Mat. Med.*, 3rd edition, vol. ii., p. 1077.)

In his lectures Dr. Pereira used to tell his class that Russian castor, though comparatively worthless, was sold for £2 per ounce, while the American, rich in resin, fetched but 20s. per pound. This may teach us that a traditional preference sometimes attaches to an article less abundant in the market, though intrinsically less valuable; and I have some suspicion that this applies to the varieties of aloes.—*London Pharm. Journ. Dec.* 1860.

ACETUM IPECACUANHÆ.

By MR. GEORGE JOHNSON.

Some time ago I was anxious to find some cheap menstruum for the active principle of ipecacuanha, *i. e.* emetina; and on reading the article relating to that substance in Pereira's *Materia Medica*, I found that emetina is easily and entirely soluble in acetic acid.

I at once thought, why here is the very thing I want; and

accordingly tried the experiment of making an acetic solution of the root, which I did in the following manner :—

Two and a half ounces of ipecacuanha were finely bruised, and allowed to macerate for twelve hours in five fluid ounces of acetic acid. Thirty-five ounces of water were then added, and the maceration continued for twenty-four hours longer, with frequent shaking. The solution was then filtered, and the residuum strongly pressed. The resulting solution is of a rich brown color, very similar to well-made ipecacuanha wine, and when tested, either chemically or medicinally, is nearly double the strength of that preparation.

Being carefully neutralized with ammonia, and treated with a few drops of tincture of galls, a precipitate of tannate of emetina is produced, much larger in amount than that from an equal quantity of ipecacuanha wine similarly treated. I have supplied two medical friends with a portion of the preparation, and they report very favorably as to its effects, both as an expectorant and emetic. One of them administered fifteen drops to one of his own children, about one year and a half old, and it produced instantaneous vomiting; and in another child of five years old the same quantity produced nausea and retching.

This preparation has several important advantages over the ipecacuanha wine, among which I suggest the following:—

1st. It is cheaper, not being half the price of the old preparation, and if introduced into the Pharmacopœia it would be a boon to medical men who dispense their own medicines, and particularly to the medical officers of hospitals and dispensaries, who, from motives of economy, frequently use tartar emetic as an expectorant, when, if there was any cheap preparation of ipecacuanha, they would gladly and frequently substitute it.

2d. This preparation could be made of a uniform strength, and might always be depended on, whilst the wine, containing a variable per centage of alcohol, will vary in a like proportion in the quantity of active matter dissolved.

3d. The *acetum ipecacuanhæ* will keep for a long time without undergoing decomposition or depositing a sediment. Ipecacuanha wine, however well prepared, or however bright it may be when recently made, soon becomes cloudy, and deposits a dirty sediment. This most probably represents a portion of its

active matter, and if so, every month it is kept its efficacy must be diminishing. Add to this fact the one just before alluded to—viz. the possible original deficiency of alcohol in the wine employed—and, however charitably disposed we may be, we can hardly avoid the conclusion, that much of the ipecacuanha wine dispensed is not of much therapeutical value.

These advantages of the *acetum* over the *vinum ipecacuanhæ* have appeared to me so great as to entitle the former to a place in the Pharmacopœia; hence my present communication. I hope the subject may be viewed in the same light by the Pharmacopœia Committee, and that they will lay it before the Committee of the College; for if the latter should decide to adopt the preparation, I should have the happiness of feeling that I had done a little, though but little, for the advancement of Pharmacy.
—*London Pharm. Journ. Dec. 1860.*

PATENTS IN THEIR RELATION TO PHARMACY.

By EDWARD PARRISH.

The practice of all civilized nations recognizes the utility of securing to the inventor the profits arising from his ingenuity and industry, by imposing legal restrictions upon its unauthorized use by others. So universally is this the case, that the moral or ethical view of the subject is seldom spoken of or discussed. The product of a man's mind is presumed to be as much his own as the product of his hand; his ideas as much his property as the results of his labor, and no one seems to dispute it. And yet there is a certain point of view from which the fact of thinking a happy thought and working out a good result, appear widely different. In nothing else has a man so sure a title as in the product of his own industry; but whence came those flashes across his mind which he calls ideas? Are any of these purely his own? Has he not inhaled the prevailing thoughts of his age and of past ages (which are all embodied in the present) as he breathes the atmosphere around him? Who can tell from whence any great inventor has derived the initial idea of his invention, or what inventor can even answer this to himself?

But on the other hand, if thought be mental labor, why are

not its results just as much property as the results of manual labor?

These considerations have engaged my attention in endeavoring to determine the right and wrong of patents in medicine. I confess they offered me no satisfactory starting point for a discussion of the question; it seems to resolve itself into one of humanity and expediency, and here we have, perhaps, firmer ground to tread upon.

It is alleged that the direct effect of the patent laws is to stimulate invention: that men direct their mental energies in this direction, entirely from the hope of profit, and the public are therefore benefitted by them, though there may be an apparent monopoly in each case of their operation; granting this, the question becomes a simple one as to the degree in which society is likely to be benefitted by their application to any particular pursuit.

In the matter of medicines, the profession to whom the healing art is mainly intrusted, is pretty unanimous in maintaining that no interest of an inventor should stand in the way of the free and unrestricted use of every improvement that the ingenuity of man may devise either in the means of cure, or the modes of applying them. It is the boast of the liberal profession of medicine, that what ever is known by one as valuable or useful for alleviating pain or restoring the diseased to health, may be freely known to all and used without restriction.

That this is expedient in the case of physicians is scarcely doubted by any thoughtful person; it certainly takes away one motive for the application of ingenuity in the difficult art of healing, but we can not ignore the superior force of the higher motives which influence the conscientious practitioner. In no other profession have we so noble an example of liberality in communicating and applying the results of experience and the deductions of science to the relief of suffering, and none have so rich a reward in the esteem and gratitude of the public. The medical profession is, however, very different from ours. Manufacturing and merchandizing are our chief pursuits, our motive is more immediately pecuniary, though the liberalizing influences of science, and especially our connection with the relief of those maladies which are the common lot of our race, modify the

motives which pertain to ordinary business, and lead us into affiliation with the liberal professions. Competition, which is the great moving spring of business, is partially shut out of the profession of medicine; physicians professedly ignore it entirely, yet we all know that it operates practically with more or less force upon them, and we see its effects in our daily intercourse with the public, however, they may seek to conceal it from their professional brethren.

With us, however, there is no concealment of competition. We are all trying for business; competing openly, and I hope for the most part honorably, with our neighbors, and it need not affect our friendly relations, though it does somewhat modify our course in regard to the subject we are discussing. To us a new invention inevitably presents itself in a business aspect, while to the true physician its humanitarian bearings are most prominent, and this, it seems to me, puts us in different positions in regard to the question of patents.

Perhaps I here do injustice to our profession, which presents many conspicuous instances of the most liberal and professional spirit; its Colleges, its journals, and this Association, as far as they go, are palpable testimonials to its comparative freedom from niggardly motives, from the hoarding of ideas and experiences which from their very nature ought to belong to the common stock; still I rely upon the discernment of my hearers to recognize the difference to which I refer as inherent in the nature of the two pursuits,—the one strictly a liberal profession,—the other a combined profession and trade. It is true, we do not sanction concealment in regard to the composition of medicines we may originate, but we do not compel a disclosure of all the results of our experience in its preparation. We do not conceal the knowledge we possess of the best means of judging of the quality of drugs, but we do not necessarily tell our competitors where best to obtain them or how to render them most attractive to customers.

Inventions of value, present the strongest cases for the exercise of concealment; unless some means are provided for the protection of the inventor in the legitimate fruit of his ingenuity; and concealment is the worse evil to society in the case. On the other hand, in case of inventions of real and permanent value

which are the only ones of much utility to the inventors, the public must be the losers just so far as free and open competition is shut out.

The opposite extremes which prudence would seem to indicate we should avoid, are perhaps best provided against by the course which I understand the professional sentiment now allows among the more respectable pharmacutists. As a profession, we recognize no patenting of medicines, and the U. S. Commissioners, at the Patent Office, rarely allow this class of patents when applied for; and in the few instances in which they grant them, merely patent "the compositions of matter," never patenting them as specifics for any particular diseases, nor as remedies possessed of any special therapeutic properties. In fact, so opposed is the system of patenting to the interests of those who prepare and vend proprietary medicines, that the chief applications come from western practitioners for "blood purifiers," "female aids" and other abominations, few of which possess the requisite originality to claim a patent, and from none of which would the public gain anything, in the event of their being fostered into life by the aid of our laws. Some of the countries of Europe refuse patents for food or medicine, and I believe the number issued in any country to be small. The number of patents issued for medicines in this country in a year, does not exceed six or eight.

The idea that a medicine is patentable at all, is liable to one objection which I may here state. The medical colleges, holding characters from the several States, are understood to grant in their diplomas the right to prescribe and compound all the "compositions of matter" applicable to the cure of disease. Has the U. S. government a legal right to contravene or limit these chartered rights of physicians by declaring that any particular combination shall not be prescribed or administered except by a certain patentee?

The views advanced in relation to patenting medicines does not apply equally to processes or to forms of apparatus used primarily or incidentally in their preparation. A patent seems here to be legitimate and of service as a stimulus to invention and a reward or compensation for the investment of time and money in perfecting it.

Without this stimulus, few men would employ themselves in perfecting those processes upon the improvement of which the progress of pharmacy, as well as of kindred arts, so entirely depends, and the public would be the losers.—*Proc. Amer. Pharm. Asso.*, 1860.

ON THE MANUFACTURE OF OXYGEN.

By MM. H. ST. CLAIRE DEVILLE and H. DEBRAY.

Commissioned by the Russian Government to study the dry treatment of platinum ore, and the revivification of this precious metal by fusion according to the new metallurgic processes proposed by us, we have directed our later researches to the economical preparation of oxygen; and feeling convinced, from the point to which we have brought this question, that manufacturing industry, either as regards lighting or the working of metals, will derive benefit from our experience, we extract from the report addressed by us to the Russian Minister some brief details respecting the wholesale manufacture of pure oxygen.

We have experimented on large quantities of oxygen, and have successively extracted it from the following materials, viz., manganese, chlorate of potash, chloride of lime, nitrate of soda, nitrate of baryta, binoxide of barium, sulphate of zinc, and sulphuric acid. We will confine our remarks here to the last two substances, which are employed for the first time to our knowledge in the extraction of oxygen. We will first mention that we have repeated on considerable quantities of binoxide of barium the process of M. Boussingault, and have obtained the same results as that gentleman, though meeting with some practical difficulties, which, however, can easily be surmounted in a manufactory as soon as baryta by M. Kuhlmann's operations can be supplied commercially in sufficient quantities, and at a low rate, in the anhydrous state. It can then be easily and economically utilised for the production of oxygen.

Sulphate of zinc, which can be obtained in such large quantities by the action of the galvanic pile, is a substance not much in use at the present time; all its elements may be utilised in

the following manner:—By calcining it alone in an earthen vessel it is transformed into a light, white oxide, which, when the sulphate is pure, can be used in painting; into sulphurous acid, which is collected in a concentrated solution, or as a sulphite, which is now applied to numerous purposes, and, lastly, into pure oxygen. The complete decomposition of sulphate of zinc does not require a much higher temperature than for the decomposition of manganese; it can be completely transformed into oxide of zinc and into a mixture of water, sulphurous acid, and oxygen. These are separated by the process which will presently be described for the preparation of oxygen by sulphuric acid.

Sulphuric acid decomposes at a red heat into sulphurous acid, water, and oxygen, in a very simple apparatus; a small retort, holding five litres filled with thin leaves of platinum,* or, better still, a worm of platinum filled with sponge of this metal and made red hot. Introduce into it by an S-tube a small stream of sulphuric acid, issuing from a vessel at a constant level. The gases which escape pass first through a refrigerator, which separates the water from them, and then into a washer, of a special form, which it is here unnecessary to describe. Pure inodorous oxygen and a saturated solution of sulphurous acid are the constant results. If the washing-water is replaced by lixivium of soda, bisulphite of soda, saturated with sulphurous acid, is obtained, which can be neutralised by carbonate of soda, and transformed into neutral sulphite or hyposulphite.

If the water charged with sulphurous acid is passed into the generator which feeds the lead-chambers in a sulphuric acid factory, the sulphurous acid will be transformed into sulphuric acid at the expense of the atmospheric oxygen. We have calculated that it would suffice to burn in the sulphur furnace of a sulphuric acid apparatus double the quantity of sulphur contained in the concentrated solution of sulphurous acid in order to entirely utilise the latter gas, so that with one apparatus, without sensibly augmenting the expense, we could appropriate a third part of the sulphuric acid which it produces to the pre-

* In large vessels the leaves of platinum may be replaced by pieces of brick.

paration of oxygen. As to the net cost, calculated on these data, it is so slight that it is impossible to give the exact figure or even an approximation to it. In fact, we have only to reckon as cost the very little coal required to maintain a small apparatus at red heat, and the nitrate of soda employed to determine the union of the atmospheric oxygen with the sulphurous acid; for our process consists really in taking oxygen from the air. Moreover, supposing the sulphurous acid proceeding from the decomposition of sulphuric acid to be lost, yet this sulphuric acid still remains the most economical agent for the production of oxygen, which does not cost 70 centimes for a cubic metre when crude acid is used, and which is, therefore, in this respect, for superior even to binoxide of manganese.—*Chem. News, Dec. 1860, from Comptes-Rendus.*

TIN.

If there be any one substance more than another that has rendered England famous throughout the world, it is tin. Camden, the historian, supposes that this country, from the abundance of tin which it contains, was called Britain. In the Syriac language *varatanac* signifies *land of tin*; whence is derived Britain. The mention of tin by Moses, in the 31st chapter of Numbers, 22d verse, is a proof of its being known from the most remote antiquity. Long before the Christian era the trade in tin caused many a vessel to spread its sails in the Mediterranean Sea, and to cross the Bay of Biscay to fetch it from these shores. The alchemists of old considered tin to be a mixture of silver and lead, but modern chemistry proves it to be a distinct metal. About 10,000 tons of tin are extracted every year from the mines in Cornwall and Devon, nearly the whole of which is consumed in the manufacture of tin-plate (*fer-blanc*, or white iron, as the French term it), that is, sheet iron coated with tin; and it is this substance which constitutes our famous tin-ware, which finds a market from Naples to Japan, from New York to Eupatoria. Melted tin forms a sort of varnish for iron, and prevents that metal from rusting; when copper is coated with it verdigris cannot be produced. Tin and lead melted together produce what is called "Britannia metal:" of which tea-

pots and similar domestic utensils are made. It is owing to a mordant of tin that the dyer produces the fine scarlet cloth so famous as the Royal and Military color of this country. In many other ways we could show how very useful tin is ; but it is enough for us to state that England is the tin-plate manufacturer for the whole world.—*Chem. News, Dec. 1860, from Piesse's Laboratory of Chemical Wonders.*

ON THE DETECTION OF TARTAR IN VINEGAR.

By M. L. DUSART.

The inquiry instituted by M. Dusart is founded on the solubility of potassio-tartrate of iron. The vinegar is evaporated to the consistence of extract, a little of which is dissolved in water, a few drops of solution of perchloride of iron are added, and the whole is boiled, and then sufficient solution of potash to give the liquid an alkaline reaction is poured in, then it is filtered.

If sulphuretted hydrogen indicates the presence of iron in the liquid, and produces no reaction in an alkaline liquor prepared with extract of vinegar without the addition of chloride of iron, we may infer the presence of tartaric acid, or at least the necessity for a stricter search, which is quite superfluous if the reagent does not color the liquid.

No similar results are obtainable from mineral, oxalic, malic, or citric acids. A counter-proof is always useful, because accidental substances, tartaric acid for instance, dissolve the sesquioxide of iron in an alkaline medium.—*Chem. News, Dec. 1860, from Répertoire de Chimie.*

CADMIUM.

By B. WOOD, M. D.

The properties of cadmium appear to have been less clearly determined by chemists and metallurgists than those of most other metals. Discrepancies exist in regard to it, while some of its most remarkable, if not most useful, properties are not at all noticed, at least by the generality of authors, even when explicit and elaborate as to similar properties possessed by other

metals. Our ordinary works on chemistry treat of the metal very briefly, as of little importance—one of the latest says, it “has no practical value in the arts:”—but if duly investigated it will be found, I think, to possess qualities highly useful to the arts as well as interesting to science.

The melting point of cadmium is variously stated by authors. Some place it indefinitely, “below a red heat.” Overman in his *Treatise on Metallurgy*, marks it at 550° Fahr., and indicates 600° as the temperature at which the metal volatilizes. Brande, *Dict. Science and Art*, says “it fuses and volatilizes at a temperature a little below that at which tin melts.” Webster, *Manual of Chemistry*, states that “it melts and volatilizes by a heat not much greater than that required to vaporize mercury.” Most of our chemical text-books put its melting point at 442° (from Stromeyer). While the *New American Cyclopædia*, now in course of publication, places it, on the authority of Daniell, at 360° Fahr.

It would be interesting to determine this accurately. But the heat being too high for measurement by the mercurial thermometer, and having no other, I have only been able to judge approximately by comparative tests. Melted under similar conditions with other metals, I find the metal requires for its fusion nearly the same heat as lead. It is somewhat later in melting, but on the other hand it appears to congeal a little the sooner, (which may be due to a difference in the conducting power of the two metals.) I should, therefore, place its melting point in round numbers at 600° Fahr., that of lead being placed by different authors, at 594° , 600° , and 612° . It volatilizes at a somewhat higher temperature, giving off orange-colored suffocating fumes, which, when inhaled too freely leave a disagreeable, sweetish, styptic sensation upon the *lips*, and an intolerable and persistent brassy taste in the mouth and fauces, with constriction of the throat, heaviness in the head, and nausea.

Of the general properties of cadmium as an ingredient in alloys, Overman, who I believe is high authority in metallurgy, and who, although too broad in some of his conclusions, is more rigidly exact in respect to the individual instances adduced than others that I have had the opportunity of examining, says:

“Cadmium is very soft and malleable and still all its alloys

are brittle. Its combinations are not distinguished for fluidity." Again, "The combinations of platinum, copper, and other metals with cadmium, are brittle and hard." The cause of this he ascribes to "its volatile nature and want of affinity," which, recurring to the subject, he accounts for thus:

"When it is melted with any other metal there is a tendency on its part to evaporate; the slight affinity of cadmium for other metals causes a separation of its atoms from those of the other metal, and no intimate union can be formed. If, therefore, the alloy cools there are spaces between the crystals which have been occupied by the expanded atoms of cadmium, and in cooling, these are filled again; this causes brittleness." *Treatise on Metallurgy*, p. 465.

All this is strictly true of *some* of its combinations, such as the particular instances which he cites, although by no means of "all," as will presently be seen.

Other authors, although less explicit, are to a like import, ascribing a similar general character to the metal, with examples in illustration, and without instancing any exceptions.

In a copy of an article on Alloys of Cadmium, from *Berthier's Traité des Essais*, tome 2, p. 530, furnished me by the patent office as authority on the subject, I find it stated in general terms that "most of the alloys of cadmium are brittle:" the individual alloys cited are particularly characterized as brittle, and no mention is made of others.—The combination with mercury is thus described: "Cadmium unites with great facility with mercury, even when cold. The amalgam is of a silver white, and texture granular and crystalline. It can be obtained in octohedrons. It is hard and very fragile. Its density is greater than that of mercury. It fuses at 75° [centigrade.] It contains 0.217 of cadmium."

Combined in these proportions the compound will indeed be comparatively fragile; but one might be led to infer from this description that the metals combine in no other proportions. I have seen this particular form of amalgam cited by other authors when speaking of the combination of cadmium with mercury, but without any allusion to other compounds of these metals; although they unite with facility in other proportions, forming amalgams particularly noteworthy as contrasted with those of other metals.

While it has been assumed as a general rule as above quoted, that the combinations of cadmium are not distinguished for fluidity, I have not found its fluidifying properties in respect to certain metals and alloys noticed in any work to which I have had access. *Some* of its alloys indeed are *not* remarkable for fusibility, but rather for the reverse; such are its alloys with silver, antimony, and mercury, their melting point being but little lower or even higher than that of the mean of their constituents. But others are much more fusible than the mean, as its alloys with lead, tin, copper, bismuth, zinc. In certain instances it manifests this property in so eminent a degree that it is singular it should not, if known, have been explicitly stated in all professed descriptions of the metal. Bismuth holds a high rank among metals for its property of promoting fusibility in alloys, as is particularly remarked in all chemical text-books, and wherever the metal is treated of, its alloys with lead and tin being specially noted as extraordinary instances. But in some combinations cadmium displays this property more decidedly than even bismuth. The alloy composed of from one to two parts of cadmium, two parts of lead, and four parts of tin, is more fusible than the corresponding alloy of two parts (or less) of *bismuth*, two of lead and four of tin. In smaller proportions its superiority is still more marked, requiring much less to produce the same effect, while it does not impair the tenacity and malleability of the alloys, but confers hardness and general strength.

As to the brittleness which cadmium is said to communicate when combined with any other metals, the facts are, *some* of its alloys even with malleable metals are "brittle." But others are highly tenacious and malleable. Its alloys with gold, platinum, and copper, afford instances of the former. Its combinations with lead, tin, and to a certain extent with silver and mercury, are examples of the latter. An alloy of two parts silver and one of cadmium is perfectly malleable and very hard and strong; with equal parts of each it is also malleable but possesses less tenacity; but when mixed in the proportions of two parts of cadmium and one part of silver, it is brittle. Equal parts of cadmium and mercury form a tough and highly malleable composition; in the proportions of two parts of the latter to one

of the former; the amalgam is nearly equal in malleability, but possesses less strength. These mixtures are remarkable in view of the fact that most amalgams are exceedingly frail and brittle. A mixture of two or three parts of tin with one part of mercury is so fragile as almost to drop to pieces in handling: the amalgams with lead, bismuth, &c., are similar.

The fusibility of the compounds of cadmium and mercury is nearly that of the mean of their constituents, as indeed, appears to be the case with other amalgams. I do not perceive that mercury acts as a fluidifying agent in alloys—it does not strictly promote fusibility but serves merely to communicate of its own fluidity to the compounds in nearly the ratio in which it is employed; it does not, like cadmium, bismuth, &c., confer any new property in this respect. Being fluid at 39° below the zero of Fahrenheit's scale, it will of course, if it only retains its own property, reduce the melting point of the compounds into which it enters as an ingredient, below that of the metals with which it is united.

Most of the mixtures of mercury with other metals, although it may form certain definite compounds with them, indicate combination by simple solution and mechanical admixture rather than by chemical affinity. With cadmium, however, it exhibits a marked affinity for forming amalgams, or as they might be appropriately designated, *alloys* which possess distinctive characters, indicating a true chemical combination.

But I leave these speculations to professed chemists, hoping the points herein referred to may serve to incite attention to a subject which I think will repay investigation.—*Journ. Franklin Institute, Aug. 1860.*

ON THE PREPARATION OF HYDROGEN REDUCED IRON, AND ON THE MEANS OF PRESERVING IT FROM OXIDATION.

By M. S. De Luca.

Pure iron in a state of minute division, known by the name of "iron reduced by hydrogen," so much used in medicine, is now largely manufactured, but without the least security as to

its purity. Iron, prepared for industrial purposes, is almost always impure, for the simple reason that in its wholesale manufacture the purification of the re-agents and of the products is only partial; there is a limit at which we must stop, but at which we do not find that degree of purity which should always characterise substances introduced into the animal economy. Moreover, the reduced iron of commerce is often mixed with fine iron filings, and sometimes it even consists entirely of ordinary iron reduced to very fine powder by a filing machine.

It is, however, easy to detect these sophistications. It is sufficient to treat the suspected iron by a pure diluted acid, which, if the iron is pure and contains no ordinary iron, will dissolve it, and produce a limpid solution free from residue. This process also affords indications of the sulphur contained in almost all reduced irons more or less abundantly; it can be detected by paper saturated with a solution of acetate of lead, placed in contact with the hydrogen which is evolved when iron is treated by a dilute acid, the paper becoming black if sulphur is contained in the iron.

It is very important to obtain iron exempt from sulphur, but it is impossible to get it pure by the ordinary industrial process; it must, in fact, be prepared in the laboratory with scrupulous care. To procure pure iron, an oxide of iron of almost absolute purity must be first prepared; but if this oxide is obtained by decomposing the sulphate of iron, it is almost impossible to get rid of a portion of adherent sulphate, which repeated washings fail to remove. It is preferable to decompose an acid chloride of iron by ammonia, in order to obtain the oxide pure. Hydrochloric acid eliminates all the sulphur from the iron, under the form of sulphuretted hydrogen, and boiling the acid solution is a sure means of driving off all trace of this gas which may lurk in the solution. Then, by precipitating the chloride of iron by ammonia, soluble and volatile compounds are formed, easily eliminated by heat and washing.

When we propose to obtain iron free from sulphur, it is not sufficient to provide pure oxide of iron; the hydrogen itself which is employed in excess in the operation of reduction must contain no sulphur. Those accustomed to the practical operation of a laboratory, and familiar with chemical manipulation,

can appreciate perfectly all the difficulties to be encountered in purifying gas. The affinities between gaseous substances and re-agents are very limited, particularly when the latter are liquids; prolonged shaking is frequently requisite to obtain complete absorption; and it is scarcely necessary to recall here the fact that 3000 shakings are sometimes necessary to force sulphuric acid to absorb olefiant gas. Then, to purify hydrogen, there must be a slow disengagement of gas, which must be distributed through porous bodies, saturated with the proper re-agents, and these bodies must be introduced into tubes vertically disposed, and the gas enter at the superior extremity of these tubes. Thus hydrogen, notwithstanding its great lightness, traverses these tubes from above downwards, and comes in contact with the re-agents, depositing its impurities and losing all its sulphur.

The simple friction of the vulcanised india-rubber tubes generally used for connecting the different parts of apparatus, is another source of sulphur. A current of pure hydrogen or pure carbonic acid passed through these tubes will produce in the water through which the gases bubble up a deposit of sulphur, which can then be transformed into sulphuric acid by the action of nitric acid, and which can be weighed in the state of sulphate of baryta. Therefore, if india-rubber tubes are used, they should be boiled in a solution of potash before they are employed to join the different parts of a hydrogen apparatus, when this gas is employed to reduce the oxide of iron.

For the preservation of reduced iron from oxidation, it should be put into previously dried glass bottles; and this operation should be effected in an atmosphere of hydrogen. The iron should be introduced by means of glass measures, containing exactly a given weight of iron. The bulbs must then be sealed with the blowpipe. Thus it appears that all the reduced irons of commerce which have been examined contain sulphur; that they often deposit silica and blackish substances when treated by weak acids, and that consequently they are impure. It would be well if pharmaceutical chemists would themselves carefully prepare iron used for medicinal purposes, since manufacturers can only supply it of a relative purity.—*Chem. News, from Journal de Pharmacie et de Chimie*, t. xxxviii. p. 275.

A COMPOSITION NAMED ZEIODELITE,

A kind of Paste which becomes as hard as Stone, is unchangeable by the Air, and being proof against the action of Acids, may replace Lead and other substances for various uses.

By JOSEPH SIMON.

Zeiodelite is made by mixing together 19 lbs. of sulphur and 42 lbs. of pulverized stoneware and glass. The mixture is exposed to a gentle heat, which melts the sulphur, and then the mass is stirred until it becomes thoroughly homogeneous, when it is run into suitable moulds and allowed to cool. This preparation is proof against acids in general, whatever their degree of concentration, and will last an indefinite time. It melts at about 120° Centigrade, and may be re-employed without loss of any of its qualities, whenever it is desirable to change the form of an apparatus, by melting at a gentle heat and operating as with asphalte. At 110° Centigrade it becomes as hard as stone, and therefore preserves its solidity in boiling water. Slabs of zeiodelite may be joined by introducing between them some of the paste heated to 200° Centigrade, which will melt the edges of the slabs, and when the whole becomes cold it will present one uniform piece. Chambers lined with zeiodelite in place of lead, the inventor says, will enable manufacturers to produce acids free from nitrate and sulphate of lead. The cost will be only one-fifth the price of lead. The compound is also said to be superior to hydraulic lime for uniting stone, and resisting the action of water.—*Journ. Frank. Ins.*, from *Lond. Chem. News*.

EXPERIMENTS ON SPERMACETI OINTMENT AND OLIVE OIL

By MR. J. B. BARNES.

On the 6th of October, 1858, a paper by Mr. Richard Giles, of Clifton, was read in this room, on the preparation of spermaceti ointment. Differences of opinion were expressed; Dr. Redwood defended the practice of using bleached olive oil in this preparation. "He stated that the specimens of olive oil in the museum of this Society were always colorless, in consequence of their being exposed to the light in a glass case, and

could it be said that this oil was unfit for use? Mr. Barnes had stated, when bleached, it was more liable to become rancid. Possibly this might be the case when chemical agents were used for bleaching it, but he was not aware that it was necessarily more prone to become rancid when colorless than in the ordinary state. Indeed, there were some circumstances which would seem rather to lead to an opposite conclusion. Thus, he had observed that during the bleaching of olive oil, there was usually a deposit formed, consisting of flocculent matter, and this organic matter, if retained in solution, would be likely to promote the kind of change which occurs when the oil becomes rancid.

"The public approved of spermaceti ointment made with bleached oil, and until it could be shown that this was inferior to the other, he thought it too much to condemn the bleached oil as an unwarrantable deviation from the instructions of the Pharmacopœia."

Believing that this question could not be settled by words only, I determined upon making a few experiments, in order to ascertain which is the best preparation—that made with natural yellow olive oil, or that made with bleached olive oil. Also to discover whether olive oil exposed to light alone, would bleach and whether the bleaching by that agent would remove its characteristic odor and render it rancid.

On the 12th of October, 1858, I had these four specimens of spermaceti ointment prepared. No. 1 was made with *sweet* olive oil of the usual yellow color, white wax, and spermaceti. No. 2 with *sweet* olive oil (yellow), unbleached bees' wax, and spermaceti. No. 3 with fresh olive oil, bleached by means of animal charcoal, spermaceti, and white wax. No. 4 with fresh lard, white wax, and spermaceti. The Pharmacopœia proportions were employed. These ointments have been kept loosely covered in ordinary covered pots in the shop, exposed to the usual changes of temperature.

At the end of three months I examined them, and found Nos. 3 and 4 decidedly rancid and unfit for use, whilst No. 1 and No. 2, those prepared with unbleached materials, were quite good, possessing the usual pleasant smell of good ointment. In order to ascertain how long Nos. 1 and 2 would continue

good, they were set aside, and have again been examined, together with Nos. 3 and 4, after the expiration of two years.

Small quantities of each specimen, Nos. 1, 2, 3, and 4, were boiled in separate portions of distilled water. After cooling, the water was poured off from each and tested with blue litmus paper, and the following results were obtained :—Nos. 3 and 4, the bleached oil and lard preparations, instantly reddened the test paper in a most decided manner ; whilst No. 1, made with unbleached olive oil, white wax and spermaceti, showed only a *very* slight indication of the presence of an acid, and not until some moments had passed did the paper become slightly reddened. No. 2, the specimen prepared with unbleached oil, yellow wax and spermaceti, did not exhibit the smallest indication of the presence of an acid. And, moreover, you will perceive, upon smelling these ointments, that No. 1 has only the slightest possible rancid odor, and that No. 2 has not the faintest trace of rancidity ; in fact, it is as good now as it was the day it was prepared ; whilst Nos. 3 and 4 are most decidedly rancid and quite unfit for use as ointments.

These results have exceeded my expectations. I scarcely thought it possible that spermaceti ointment prepared with unbleached oil would keep so perfectly good for so long a period as two years. The ointment made with both unbleached oil and wax is undoubtedly the best ; therefore, I think the Pharmacopœia Committee should recommend the employment of unbleached bees' wax in the preparation of this ointment and cerate.

It is to my mind very evident that the peculiar odor of yellow wax has a preservative action upon it, and that nature has supplied it with this principle in order that it may be better adapted for our use. So with olive oil. Its odor, I am inclined to believe, has a preservative effect upon it. We have two other familiar instances of the power of odoriferous principles in preserving fatty substances, namely, pomade divine and benzoated zinc ointment.

The next experiment was commenced on the 7th of October, 1858, and consisted in filling these two bottles with fresh olive oil from the same jar, and corking them securely. One of them, marked No. 1, was placed outside a window on the south

side of my house. It has there been exposed to all the changes of temperature and the action of the sun until the present time, in order to test the power of light upon it as a bleaching agent. The result, as you see, is, that it is not bleached; it is almost as yellow as that contained in the bottle marked No. 2, which has ever since been carefully kept from the light. Therefore, it is clear that light alone will not always bleach olive oil, and I am informed that at Horner's they even occasionally meet with samples of castor oil which will not bleach after exposure to the sun for years. This being the case, we cannot depend upon obtaining bleached olive oil which has not been oxidized; for all the processes, such as treating with animal charcoal, fuller's earth, magnesia, chlorine, &c., are processes of oxidation, and must end in rancidity.

The results of these simple experiments show us very clearly, that it is not the thing to use bleached oil and wax in the preparation of ointments. Whatever might be said to the contrary, by ingenious special pleading, the framers of the Pharmacopœia never could have intended that bleached oil should be used in the making of spermaceti ointment; and I trust those of our members who have acquired the habit of using bleached oil or lard in this preparation, will discontinue the practice, as it is most desirable that uniformity should be the rule.—*Lon. Pharm. Journ.*, January, 1861.

ON SOME OF THE APPLICATIONS OF GLYCERINE.

I will now proceed to describe the new process for obtaining and purifying glycerine, and may remark that the road by which we arrived at pure glycerine was a rather circuitous one. Our first step was to do away with the lime process of saponification, and with it our only source of impure glycerine. By our first improvement in separating the fat acids from neutral fats, the glycerine was decomposed by the direct action of concentrated sulphuric acid at a high temperature; and all that remained of it was a charred precipitate. A new process* for decomposing

[* It is sometimes difficult to act ingenuously in stating historical facts even in chemistry. Most of the credit of Mr. Wilson's process for distilled glycerine, is due to Mr. R. B. Tilghman of this city, whose patent

neutral fats by water under great pressure coming under our notice, led us to look again more closely into our old distilling processes; and the doing this showed, what we had often been on the brink of discovering, that glycerine might be distilled.

In our new process the only chemical agents employed for decomposing the neutral fat, and separating its glycerine, are steam and heat; and the only agents used in purifying the glycerine thus obtained are heat and steam: thus all trouble from earthy salts or lead is escaped.

Distillation, however, purifies the impure glycerine of the old sources.

Steam, at a temperature of from 550° to 600° Fah., is introduced into a distillatory apparatus, containing a quantity of palm oil. The fatty acids take up their equivalents of water, and the glycerine takes up its equivalent; they then distil over together. In the receiver, the condensed glycerine, from its higher specific gravity, sinks below the fat acids. Sufficient steam must be supplied, and the temperature regulated, otherwise the elements of the glycerine do not take up their equivalent of water, and acroleine is evolved,—a body of a very different character, an acrid eye-inflaming vapor, appreciated only by those who have had the misfortune of an experimental acquaintance with it.

In an ordinary apparatus the glycerine distilled from the neutral fat is not in a sufficiently concentrated state for most purposes: it should therefore be concentrated, and, if discolored, be redistilled. It is then obtained of sp. gr. 1.240, and contains 94 per cent. of anhydrous glycerine. It can be concentrated to sp. gr. 1.260, or to contain 98 per cent.

Mr. Wilson then described attempts which had been made to process is alluded to by the author, and who sold his patent to Price's Candle Company, where Mr. Wilson is engaged. To Mr. Tilghman is due the credit of discovering that the exposure of fats and water to a temperature above 500° resolved them into hydrated acids and glycerine, and Mr. Wilson extended this idea to the application of the water as super-heated steam, and thus arrived at the result of the volatility of glycerine without decomposition when aided by watery vapor in the absence of atmospheric air. Why did not Mr. Wilson mention Mr. Tilghman?—*Editor Am. Journ. Pharm.*]

apply pure glycerine in some pharmaceutical preparations. Among the most important of these was its introduction into the *Mistura Ferri Composita*, of the Pharmacopœia, for the purpose of preserving the protocarbonate of iron from change. In the Pharmacopœia formula, sugar is ordered, from the well-known property it possesses of arresting the conversion of the protosalts of iron into persalts. Mr. Wilson says, in experimenting with pure distilled glycerine, it was found to possess this property of sugar in a marked degree, together with another—that of dissolving the carbonate of iron immediately on its formation, yielding a deep green solution, which remains unchanged after long exposure to light and air. A concentrated *Mistura Ferri Composita*, eight times the strength of the Pharmacopœia preparation, may be made by dissolving the carbonate of potash and protosulphate of iron in separate portions of glycerine, and mixing the solutions. At the moment of mixture, the protocarbonate of iron formed is dissolved, forming a bright green solution. This may be diluted with water, and the powdered myrrh added when required. The carbonate of iron separates on dilution as a flocculent precipitate.

Glycerine was also tried as a substitute for sugar syrup of iodide of iron, but here it did not appear to answer as well as sugar.

Among other applications that were suggested, were the following :—

Solution of ammonio-citrate of iron in glycerine, in the proportion of eight grains to the fluid drachm.

Solution of citrate of iron and quinine, in the proportion of two grains to the fluid drachm.

Solution of disulphate of quinine, two grains to the fluid drachm, no addition of acid being required.

Solution of the alkaloid quinine, in the proportion of one grain to the drachm.

Solution of tannin, eight grains to the drachm, the tannin being thus preserved from the decomposition which occurs in aqueous solutions.

It was suggested that essences of senna and rhubarb, eight times the strength of the Pharmacopœia infusions, might with advantage be made with glycerine, the latter masking the taste

of the medicines, and thus facilitating their administration to children, while the absence of spirit would give an advantage to these and other similarly prepared essences over those now generally used.

Glycerine was also recommended for preparing essences of cloves, cinnamon, lemon, &c.; also for syrup of phosphate of iron, bromide of iron, and iodide of quinine. It had been found useful for preserving fresh lemon juice, and for preserving the soft consistence of pill masses and confections.

Mr. Waugh did not see much advantage in the use of the proposed concentrated *Mistura Ferri Composita*, unless it could be shown that after diluting the concentrated solution and adding the other ingredients of the mixture, it would keep better than that made in the usual way.

Mr. Hills said he had found glycerine a very good solvent of arsenious acid, which it dissolves to the extent of a drachm to a fluid ounce.

Mr. Brady said such a solution had been tried for preserving animal and vegetable substances from decay, but it was found that fungi grew in the solution very rapidly.

Mr. Haselden described the results of some experiments he had made with reference to the solvent and preservative power of glycerine. Gallic acid was freely soluble in it, so also was aloes and some resinous substances, but not the pure resin of scammony. It promoted the solution of borax in tincture of myrrh, no water being required. When added to tincture of kino, it prevented the gelatinization of the tincture, which otherwise frequently occurred. The vegetable extracts were soluble in glycerine, and some of them, such as belladonna, when thus dissolved, formed useful preparations for external application. When used as a solvent, it was often important to have the glycerine in its greatest state of concentration. He had generally employed Price's glycerine concentrated by Smith. This concentrated glycerine dissolved twice as much quinine as that which was not concentrated.

Mr. Barnes had kept iodide of iron in glycerine without change for years, by using the best concentrated glycerine.

Mr. Squire said that some time ago a preparation, called

Plasma, consisting of glycerine and starch, was proposed as a medium for external applications, in the place of ointments. His experience of this preparation had been, that it became mouldy after being kept for some time.—*Trans. Pharm. Society*, Dec. 5, 1860.

ON A NEW ALKALI-METAL.

By MM, BUNSEN and KIRCHHOFF.

In a recent number of the *Philosophical Magazine* there is given an account of some researches by MM. Bunsen and Kirchhoff on the effect produced by various metals on the spectrum of a flame in which their chlorides are volatilised. That part of their investigation which is more particularly interesting consists of a method of photochemical analysis of exquisite delicacy, which the authors have specially studied in relation to the alkali-metals.

These metals have been employed in the form of chlorides, which have been purified with the greatest care. When these are introduced into a jet of flame they volatilise to a greater or less extent, and then communicate to the flame the special character above alluded to, and which is observable when the spectrum produced by the flame is examined by a sufficient magnifying power.

The above named memoir is accompanied by a color plate which illustrates the spectra of the alkali-metals with their characteristic rays. These rays are the more visible in proportion as the flame is less luminous and its temperature higher. The ordinary Bunsen gas-burner answers admirably for these experiments. The rays shown by the chlorides of potassium, sodium, and lithium are perfectly well defined; those of barium, strontium, and calcium are more complicated, and require a somewhat experienced eye for their identification. They are, however, quite distinct enough to be easily recognised, even when salts of these metals are mixed together; for the great advantage of this method of analysis is, that foreign matters have no influence on the results, the authors being able to detect with certainty the different elements in a mixture containing the tenth of a milligramme of the metals mentioned above. Sodium, with

its yellow ray, first appears; after that the well-defined red ray of lithium; next is seen the paler rays indicating potassium; and, after these rays have disappeared, they are replaced by those of calcium and strontium, which remain visible for some time. The absence of one or other of these sets of rays shows the absence of the corresponding metals.

We are, then, by this method placed in possession of an analytical process of the most extraordinary delicacy. The researches of our authors prove that this sensibility almost approaches the infinite, the eye being able, by its means, to recognise the presence of the $\frac{1}{300000}$ part of a milligramme of chloride of sodium. It must not, therefore, be a matter of surprise to find sodium distributed almost everywhere, especially in the atmosphere, in which is almost always a sufficient quantity to show the sodium ray. The same may be said in great measure of lithium. In a room of a capacity of about 60 cubic mètres was exploded a mixture of sugar of milk and chlorate of potassa, containing 9 milligrammes of carbonate of lithia. The lamp, being placed at some distance off, became quickly colored, so that the red ray could be distinctly visible in the spectrum. The authors estimated that this sensibility reached the nine millionth part of the amount taken.

After this it must not be a matter of surprise to find that lithium is one of the widest spread elements. The water of the Atlantic was found to contain it. It was also found in the ashes of plants grown on a granite soil, in the vine, in tobacco, and also in milk and in human blood. In the mother-liquors of tartaric acid manufactories the lithia is found to be so concentrated as to be worth commercial extraction; and the same may be said of certain mother-liquors of saline springs.

With so delicate a reaction as the one just described, of an almost infinite sensibility, and applicable to all metals, the presence of elements, existing in so small quantities as to entirely escape ordinary analysis, may be rendered visible. Many observations tended to this point, and MM. Bunsen and Kirchhoff now announce definitely (*Annal. der Physik und Chemie*) that they have discovered a new alkali-metal, the fourth member of the group of potassium, sodium, and lithium. At present they have only found it in very small quantities in the mineral water

of Kreuznach, in the saline water of Dureckeim, and in one of the sources of the Bade—the Umgemach.

The chloride of the new metal differs from those of sodium and lithium by the yellow precipitate which it produces in the presence of bichloride of platinum. It is distinguished from potassium by its nitrate being soluble in alcohol. Introduced into a flame, and examined with a prism, the vapours of the new chloride show a very interesting spectrum, consisting of two blue lines, one of which, the fainter, almost corresponds with the blue of strontium; the other, also a well defined blue line, is situated a little further towards the violet extremity of the spectrum, and rivals the lithium line in brightness and distinctness of outline.—*Chem. News*, Nov. 24, 1860.

VOLUMETRIC ESTIMATION OF TANNIN.

Müller prepares a standard solution by dissolving 18 grammes of gelatine and $2\frac{1}{2}$ grammes of alum in 320 centimètres of water. 31 cubic centimètres of this solution precipitate 1 gramme of tannin. To extract the tannin he powders the substance containing it, places the powder in a flask, and adds sufficient hot water to cover it. He then boils for a few minutes, and decants the liquor carefully into a precipitating glass. This operation is repeated five or six times, with more water, and at last powder and all are poured into the glass. The presence of the powder does not interfere with the precipitation of the tannin, but even favors the clarification of the liquor. After cooling, the standard solution is added as long as a whitish cloud is formed in the clear liquid.—*Chem. News*, Nov. 1860.

CLEANING OF PLATINUM.

To the Editor of the Chemical News.

SIR,—A remarkably rapid and perfect method of cleaning platinum apparatus consists in gently rubbing upon the dirty metal a small lump of sodium-amalgam. Sodium has the curious property of lending to mercury the power of “wetting” platinum in so complete a manner that the positive capillarity between platinum and an amalgam containing even only a few

per cent. of sodium appears to be as great as that between mercury and zinc, with this important difference, however,—in the former case the “wetted” metal does not suffer the least trace of amalgamation. Even when foreign metals, such as lead, tin, zinc, silver, are purposely added to the sodium-amalgam, the platinum surface suffers no disintegration.

When the amalgam has been rubbed on with a cloth, until the whole surface is brilliantly metallic, water is applied, which oxidises the sodium and allows the cohesion of the mercury to assert itself. On wiping the mercury off, the platinum surface is left in admirable condition for the burnisher. I suppose the sodium to act here chiefly as a diluent, diminishing thereby the cohesion of the mercury and allowing the adhesion between that metal and the platinum to predominate,—a result which is certainly assisted by the mercury enabling the sodium to offer a clean surface to the platinum, and so allowing the specific adhesion between the two latter metals to be exhibited.

I am, &c.

F. G.

Laboratory, University of Edinburgh.

—*Chem. News*, Nov. 1860.

ON THE ORIGIN OF FERMENTS.

By M. L. PASTEUR.

Among the questions arising during the researches which I have undertaken on the subject of fermentations, properly so termed, there is none more worthy of attention than that which relates to the origin of “ferments.” Whence proceed these mysterious agents, so feeble in appearance, and yet in reality so powerful; which in the minutest quantity, measured by weight, and with insignificant external chemical characters, possess such extraordinary energy? It is in an attempt to solve this problem that I have been led to the study of the so-termed spontaneous generation.

In the communication which I had the honor of submitting to the Academy on the 6th of February last, I mentioned only a single fluid appropriate for the development of Infusoria and Mucedinea, although I gave a general method applicable to all liquids.

On that occasion I showed, in a manner that has been contested only in appearance—First, that the solid particles conveyed in the atmospheric air were the origin of all the vegetable and animal productions peculiar to the fluid in question. Secondly, that these particles, examined under the microscope, are amorphous, dusty atoms, constantly associated with certain corpuscles, whose form, volume and structure show that they are organized after the manner of the ova of Infusoria or of the spores of the Mucedinea.

I am, at present, in a condition to extend the assertions contained in the communication of the 6th February to two substances, still more alterable than the sugared water mixed with albuminous matters which had been more particularly the subject of my former experiments. I now speak of "milk" and "urine." The details of the results derived from these two fluids will show, as I hope, the kind of future in store for this department of study.

I introduce about 100 cubic centimeters of recent urine into a flask capable of containing 250 cubic centimeters. The drawn-out neck of the flask communicates with a platinum tube, heated to redness. The liquid is made to boil for two or three minutes, and then allowed to cool. When refilled with air, which has been subjected to a red heat, the flask is hermetically closed.

The flask, under these conditions, may remain for an indefinite time in a stove, at a temperature of 30° C., without its undergoing any alteration. After the lapse of a month or six weeks, I cause a small quantity of amianthus charged with the atmospheric dust to fall into the flask, the mode in which this is effected being precisely that described in the *Comptes Rendus* of the 6th of February. The neck of the flask being then again hermetically closed, the apparatus is replaced in the stove.

In order to be sure that the manipulation to which the flask is submitted, for the introduction of the atmospheric dust, does not itself in any way affect the result of the experiment, I prepare a second flask similar to the other; only that, instead of allowing amianthus charged with atmospheric dust to fall into it, I substitute the same amianthus previously calcined for some moments before its introduction into the flask.

The following are the constant results of the experiments so made.

The fluid in the flask which has received the amianthus deprived of the atmospheric dust remains unaltered at the temperature of 30° C., whatever may be the duration of its exposure to this heat, which is so favorable to the putrefaction of urine. On the contrary, at the end of six hours, the urine which has received the atmospheric dust, presents organized products—Mucedinea or Infusoria. Among the latter I have noticed chiefly *Bacteria*, very minute, *Vibriones*, and *Monads*, in fact, the same Infusoria that I have found in the same urine exposed to the contact of the atmospheric air at a temperature of 30° C. During the following days will be witnessed an abundant deposition of crystals of ammoniaco-magnesian phosphates and of the alkaline lithates. The urine becomes more and more ammoniacal. Its urea disappears under the influence of the true ferment of the urine, a ferment which I have proved to be organized, and whose germ could only have been introduced in the atmospheric dust, as well as that of the Infusoria or of the Mucedinea.

Milk exhibits still more interesting properties. I have said that, before filling the flask with air which has been subjected to a red heat, and hermetically closing it, I caused the urine to boil for two or three minutes. This duration of the ebullition is sufficient, and everything leads me to believe that even less careful precautions will suffice to deprive of all viability the germs which may have fallen into the urine subsequent to its emission.

This being granted, let us repeat, without any change, the operation above described—now, however, not upon urine, but upon fresh milk; that is to say, after this fluid has been boiled for two or three minutes, and the flask has been refilled with air heated to redness, let us keep it closed at a temperature of 30° C.

After a variable lapse of time—generally of three to ten days—the milk in all the flasks thus prepared will be found coagulated. Under the prevalent views respecting the phenomenon of the coagulation of milk, there is nothing in this circumstance to excite surprise. When milk, it is said, is exposed

to contact with the oxygen of the air, the albuminous element is altered and acts as a ferment. This ferment reacts upon the sugar of the milk, and transforms it into lactic acid, which then precipitates the casein. This is the cause of the coagulation. In reality, however, things are quite otherwise. For if one of these flasks in which the milk is coagulated be opened, it is obvious, on the one hand, that the milk is *as alkaline as fresh milk*; and on the other—a circumstance tending to encourage the belief in spontaneous generation—that the milk is filled with Infusoria, most frequently with *Vibrios*, as much as $\frac{1}{20}$ th millimeter in length. As yet I have not met with any vegetable production under these circumstances.

From these facts we must admit—First, that the phenomenon of the coagulation of milk, as I hope shortly to demonstrate more clearly, is a phenomenon upon which we have had but very imperfect notions. Second, that *Vibrios* may arise in a liquid of the nature of milk which has undergone ebullition for several minutes at a temperature of 100° C., although this is not the case with respect to urine, nor to a mixture of sugar, water and albumen. Is it the case, then, that under particular conditions we may have spontaneous generation? We shall soon see how far this conclusion would be erroneous. Let the milk be boiled, not for two, but for three, four, or five minutes, and it will be found that the number of flasks in which it coagulates from the presence of Infusoria diminishes progressively in proportion to the longer duration of the ebullition. And lastly, if the ebullition be carried on at a temperature of 110 to 112 degrees, under the pressure of $1\frac{1}{2}$ atmosphere, the milk will never afford any Infusoria. Consequently, as they do arise under the conditions existing in the former experiments, this is evidently due to the circumstance that the fecundity of the germs of the *Vibrios* is not entirely destroyed, *even in water* at a temperature of 100° , kept up for some minutes, and that it is more affected by a longer ebullition at that temperature, and wholly abolished at the temperature of 110° to 112° C.

But what is to be said concerning the phenomenon of the coagulation under those special conditions of ebullition, in which the milk in contact with calcined air never affords any Infusoria? One remarkable fact is, that the *milk does not*

coagulate. It remains alkaline, and preserves, I would venture to say, entirely all the properties of fresh milk. Then if, into this milk, thus retaining its integrity, the atmospheric dusty particles are introduced, it changes and coagulates, and the microscope shows the existence in it of divers animal and vegetable productions.

It would be very interesting to ascertain whether the fluids belonging to the animal economy, such as milk and urine, contain normally or accidentally, previously to all contact with the common air, the germs of organized productions. This is a question which I hope to resolve in a subsequent communication.

The generally admitted theory of ferments, and that which of late years had received fresh support from the writings or the labors of various chemists, consequently appears to be more and more incongruous with experiment. The "ferment" is not a dead substance, without determinate specific properties. It is a being, whose germ is derived from air. It is not an albuminous substance, altered by oxygen. The presence of albuminous matters is an indispensable condition of all fermentation, because the "ferment" depends upon them for its life. They are indispensable in the light of an aliment to the ferment. The contact of the atmospheric air is, primarily equally an indispensable condition of fermentation, but it is so in virtue of its being a vehicle of the germs of the "ferments."

What is the true nature of these germs? Do they not require oxygen, in order to pass from the state of germs to that of adult ferments, such as are not met with in the products undergoing fermentation? I have not yet arrived at any fixed conclusion with respect to these grave questions. I am endeavoring to pursue the inquiry with all the attention it merits; but the really capital difficulty of these studies consists in the isolated, individual protection of the various ferments. I may assert that there are a great many distinct, organized ferments, which excite chemical transformations, varying according to the nature and organization of the ferment. But in most cases the nutriment suitable to some, allows of the development of others of them, whence arise the most complicated and the most variable phenomena. If we could only isolate one of these ferments, in

order to develop it by itself, the chemical transformation corresponding to it would take place with remarkable precision and simplicity.

I shall, in a short time, give a new instance of this, in describing the organized ferment proper to the fermentation termed "viscous."--*Lond. Pharm. Journ. from Compt. Rend. Mai, 1860.*

ON THE ACTION OF VARIOUS REAGENTS UPON IODIDE OF POTASSIUM.

By G. UBALDINI.

When nitrate of ammonia and neutral iodide of potassium are intimately mixed at the ordinary temperature and in contact with the air, the mass acquires a yellow color, and starch-paste, which acquires a blue tint, indicates free iodine in the mixture. The boracic acid of commerce acts in the same way. These two reagents acting upon a concentrated solution of iodide of potassium at the temperature of ebullition, set free iodine.

By the action of contact aided by heat, operating with dry substances in a glass tube closed at one end, iodide of potassium is decomposed with evolution of violet vapors of iodine, not only by nitrate of ammonia and boracic acid, but also by sulphate, oxalate, carbonate, and muriate of ammonia, by phosphorus salt, sulphate, phosphate, nitrate and borate of soda, chloride of sodium, chlorides of potassium and calcium, sulphates of potash and magnesia, nitrate of lime and silicic acid.

The decomposition of iodide of potassium by the above mentioned substances, does not always take place at the same temperature; thus whilst silicic acid only decomposes the iodide at the temperature of fusion of glass, boracic acid, chloride of sodium, nitrate of ammonia, and nitrate of soda cause the evolution of the violet vapors at a low temperature. Oxalate of ammonia decomposes the iodide when it begins to decompose itself; carbonate and muriate of ammonia, when gently heated with iodide of potassium, fuse with it, forming a yellow liquid which evolves vapors of iodine in contact with the air; lastly, phosphorus salt, nitrate of lime, chloride of calcium, sulphate of ammonia, sulphate of magnesia, and sulphate, phosphate and

borate of soda, decompose iodide of potassium at a high temperature, and the violet vapors only make their appearance at nearly a red heat.

Sulphate, phosphate and carbonate of lime, by the action of heat and air, partially decompose iodide of potassium; but bin-oxide of manganese, by the simple action of heat, eliminates all the iodine of the iodide.

Carbonate and nitrate of potash, and carbonate of soda have no decomposing action upon iodide of potassium.

Cantu announced the decomposition of iodide of potassium at a high temperature in a current of dry nitrogen, but this experiment repeated several times, never furnished the least evolution of violet vapors.—*Chemical Gazette, from Comptes Rendus*, August 22, 1859.

ON THE HUMOID CONSTITUENTS OF THE CINCHONA BARKS.

By O. HESSE.

In the investigation of the Huanoco Cinchona bark, Reichel found a brown matter, the properties of which differed from those of humic acid of peat, and to which he gave the name of lignoine.

Analyses of lignoine dried at 212° F., made by Hesse, gave

C	59.4	59.2	40	59.25
H	6.1	5.6	23	5.67
N	3.5	..	1	3.47
O	16	..

Lignoine, $C^{40}H^{23}NO^{16}$, dissolves very readily in alkaline carbonates, and these solutions absorb no oxygen; in other respects it differs but little from the humoid substances.

The nitrogen expressed in the preceding analysis is contained in the form of ammonia, which is set free by boiling with caustic potash, when a body of the composition $C^{40}H^{20}O^{16}$ is obtained. This body, therefore, is distinguished by its composition from the humoid bodies of vegetable mould and peat, as it contains four atoms of hydrogen more than of oxygen.

The Chinova-red prepared by Hlasiwetz has the same com-

position as the substance when free from ammonia. In this Hlasiwetz found

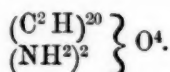
C	61.10	61.32
H	5.05	5.26

Phlobaphene also belongs here. For this body the formula $C^{20}H^{10}O^8$ was lately proposed. Reichel also obtained from red Cinchona bark a brown matter (which he calls a lignoine-like body) containing

C	61.15
H	4.65(?)

The latter substance, however, contains some ammonia, as appears from Reichel's further experiments.

It consequently appears that a brown humoid matter of the same composition is deposited in the Cinchona barks, which may be expressed by the formula $C^{40}H^{20}O^{16}$. It is essentially distinct from the China-red of Schwarz, and not to be classed with this, as has been done by Gerhardt. It is, however, remarkable, that in this humoid matter we again meet with the group $C^{20}H^{10}$, which makes its appearance if we attribute to quinine the formula

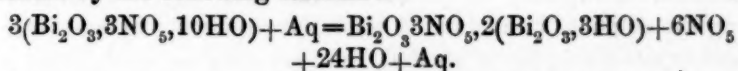


London Chem. Gaz. from Liebig's Annalen. cix.

PREPARATION OF SUBNITRATE OF BISMUTH.

MM. Bechamp and C. St. Pierre recommend the following method of making subnitrate of bismuth (*Montpelier Medical*, April, 1860.) They first make a neutral nitrate, by pouring nitric acid on powdered bismuth. The crystals of this neutral salt are drained, and then washed with a mixture of 1 part of acid and 3 of water. They are then dissolved in as small a quantity as possible; and the experiments of the authors have shown that a cubic centimetre of water, at 80° , containing 10 per cent of nitric acid, is sufficient to dissolve 1 gramme of the salt. $12\frac{1}{2}$ parts of water, are now sufficient to precipitate a part

of the crystallized nitrate so dissolved. The reaction is represented by the following formula :—



10 grammes of the crystallized nitrate should yield 6.3 grammes of the subnitrate, but only two-thirds of this quantity are obtained. The rest of the bismuth, which remains in the mother liquors in the state of subnitrate, and not as oxide, may be precipitated by carbonate of ammonia. The salt precipitated by water, gives, on analysis, 16.08 of nitric acid, and 76.8 of oxide of bismuth. That precipitated by ammonia contains 80 per cent. of oxide of bismuth. The two products differ slightly. The second, when too much ammonia has not been used, has an evident crystalline texture, a faintly acid taste, and reddens litmus. The first is crystallized, and is slightly soluble in water; it reddens litmus strongly and has a decided acid taste. The authors add, that all subnitrate of bismuth should be rejected which is in the form of an amorphous powder, is without taste, and does not act on litmus. M. St. Pierre recommends that, to free bismuth from arsenic, from 2.5 to 5 per cent. zinc should be added, and the whole heated strongly for an hour, a piece of charcoal being placed in the crucible to prevent the oxidation of the zinc. After this treatment the bismuth will contain neither arsenic nor zinc.—*Chem. News, London, Jan. 15th, 1861.*

NEW CINCHONA ALKALOID.

Schwabe (*Archiv der Pharmacie*, bd. cii. s. 273) has extracted from quinoidine a new alkaloid which he calls β -cinchonine. To obtain it, quinoidine is dissolved in dilute hydrochloric acid, then precipitated with ammonia; the precipitate is washed first with cold, then with hot water; afterwards dried and subsequently treated with cold alcohol, which in about twenty-four hours gives a brown tincture. The residue is exhausted successively with alcohol and then with water, and afterwards dissolved in dilute sulphuric acid. This solution is warmed, and, while hot, a solution of carbonate of soda is added until a crystalline pellicle forms. It is then set aside to cool, whereupon crystals of

the sulphate of *beta-cinchonine* are deposited. These are a little colored, but may be purified in the usual way. By dissolving the sulphate in acidulated water, precipitating by ammonia, and crystallizing from alcohol, the pure alkaloid is obtained in right rhombic prisms.

Beta-cinchonine $C_{20}H_{12}NO$ is anhydrous, and fuses at $150^{\circ} C$; on cooling it becomes a radiated mass; it is not volatile, and burns with a smoky flame. It is easily distinguished from the other cinchona alkaloids by its crystalline form, chemical properties, and particularly by its solubility.

The author gives the following table of the solubility of the cinchona alkaloids in different menstrua:—

	α Quinine.	β Quinine.	α Cinchonine.	β Cinchonine.
Cold water .	400 parts	15,000	insoluble	insoluble.
Boiling water .	200 "	750	2500	slightly sol.
Cold alcohol .	2 "	45		173
Boiling alcohol .	2 "	3.7	30	43
Ether . . .	60 "	90	insoluble	378
Chloroform .	6 "		40	268

Fatty oils dissolve beta-cinchonine. The alcoholic solution turns the plane of polarization to the right. The following are the chemical reactions of salts of the new alkaloid:—Chloride of gold gives a sulphur yellow precipitate; bichloride of mercury gives a white precipitate, which soon becomes resinous; bichloride of platinum an orange yellow precipitate soluble in much water; iodated water a red brown bromated alcohol a yellow precipitate; picric and phospho-molybdic acids a yellow precipitate. With chlorine and ammonia the solution becomes yellow. Gallic acid gives a yellowish white precipitate; and prussiate of potash gives a rose coloration, as with the solutions of quinine, cinchonine, and quinoidine. The author has not succeeded in obtaining neutral salts with beta-cinchonine; all are basic. The sulphate crystallizes in prisms with a rhombic base; it is insoluble in ether, but soluble in alcohol and water. The hydrochlorate crystallizes with 4 equivalents of water in prisms which are slightly soluble in ether. With bichloride of mercury they form an amorphous double salt. With bichloride of platinum they form six-sided rhomboidal prisms. Iodine gives with the sul-

phate a salt resembling the compound obtained with iodine and sulphate of quinine. It is made by dissolving (at 30° C.) 10 parts of the sulphate in a mixture of 144 parts of acetic, and 12 parts of dilute sulphuric acid, to which is added 3 parts of iodine dissolved in 115 parts of alcohol. On cooling, plates without definite form separate from the solution.—*Chem. News, London, Jan. 5th, 1861.*

NOTE ON MONOHYDRATED SULPHURIC ACID,

BY DR. LYON PLAYFAIR.

At the meeting of the Royal Society of Edinburgh, on the 7th instant, Dr. Playfair drew attention to the researches of Marignac on sulphuric acid. This chemist always found too much water in monohydrated sulphuric acid, and fixed its specific gravity, as Beneau and others have recently done, from 1.842 to 1.845.

It is well known, indeed, that this hydrate loses anhydrous acid when distilled or boiled, and the object of the present communication is to ascertain the exact conditions under which this loss takes place, as this knowledge is of importance in a practical point of view.

The author occasionally found on distilling, and afterwards heating, oil of vitriol, that acid of the specific gravity of 1.848 was obtained, but at other times the specific gravity was as low as 1.842. To explain this difference, the following experiments were made:—

1. Sulphuric acid, having a specific gravity of 1.848, and a per centage of anhydrids of 81.62 by the alkalimeter, was put in a retort, buried in hot sand, and distilled. The distillate had a specific gravity of 1.840, and a per centage strength of 80.12. It had, therefore, lost by distillation $1\frac{1}{2}$ per cent. of anhydrids.

2. The weak acid got by the last experiment was heated for half an hour to 550° F., and, after cooling, gave an acid of 1.84798 specific gravity, and strength of 81.615 anhydrids.

3. A portion of this acid now restored to its full strength and specific gravity, was violently boiled for two hours. On testing

the acid on cooling, it was reduced in strength to 80.01 of anhydrids, and to a specific gravity of 1.838.

4. The weak acid obtained in the last experiment was kept for one hour at 550° F. On cooling, it had increased to 81.62 per cent. of anhydrids, and the specific gravity was 1.84792.

As a general result of these experiments, it follows that the old specific gravity of 1.848 is more correct than that given by Beneau and Marignac; that there is a true monohydrate of sulphuric acid which loses anhydride near its boiling point, but not below 550°. The latter temperature should not be exceeded in the concentration of oil of vitriol.—*Lon. Chem. News, Jan., 1861.*

SALE OF POISONS IN FRANCE.

A medical student, named Delorme, and a retired apothecary, named Boucaumont, have been tried before the French Tribunal of Commerce on the charge of homicide by imprudence. The following were the circumstances of the case:—A young girl, eighteen years of age, went astray, but after a while was seized with remorse, and determined to commit suicide. A friend remonstrated, and, as he thought, succeeded in persuading her to abandon the intention. A few days afterwards she called on Delorme, and in the course of conversation took up a phial containing an arsenical compound. "Do not touch that," he said "it is poison." "I am not afraid of poison," she replied; and from what afterwards transpired, she appears to have secreted the phial, and went away. Two days later she committed suicide by means of this poison. The phial having been traced to Delorme, he was arrested and tried for his imprudence in allowing the girl to obtain the poison, and Boucaumont for supplying the poison, contrary to the regulations in force. The defence on the former was, that he did not know that the girl had taken the phial, and of the latter, that it was supplied with the understanding that it was required for experiments. The tribunal condemned each to three months' imprisonment, with the addition of a fine of 50f. in the case of the apothecary.—*Lon. Pharm. Jour.*

[Continued from page 88.]

plant which produces it. We know infinitely more of the cinchona-tree and other exotic plants than of the lime and nut trees of our own woods. If all chemists were to occupy themselves with the analyses of plants, after several centuries there would be still materials enough growing before their eyes to employ hundreds of hands with their chemical investigation.

The investigations which spread the most light are those which enable us to learn the composition of the individual parts of a plant at different periods of its growth, and at different epochs of its development. The material for such investigations can scarcely be procured at a distance, so we are constrained to examine that which lies near us, and not to seek afar off that which is better and easier obtained at home.

With regard to the quantity of material required for the investigation, no certain weight or measure as a minimum can be fixed. But it is better in all cases to employ too much, rather than too little, material. With materials which cannot be procured in any required or unlimited quantity, it is better to commence no analysis. Through a scarcity of material the operator is constrained to terminate the research, unable to complete it, and has time and money uselessly spent, or he arrives at incorrect results, when, from a failure of the material, he is unable to undertake a number of control experiments. It is on that account that the results of analyses which, as frequently happens, were undertaken with a few ounces of the material, seldom possess any value. In the best instances of such analyses some constituents were overlooked which were present in small quantities in the material. Many incorrect statements are made in such analyses because an insufficient number of methods of separation were employed. Mixtures of bodies are regarded as new substances, and are long carried on as the ballast of science, until later analyses prove their non-existence. Substances which are widely different from one another are confounded with each other, because an insufficiency of material was employed to prepare enough of the constituent to establish its composition in the pure state. Thus, one chemist finds tartaric acid, when another is stated to have found oxalic acid, and a third seeks unsuccessfully for tartaric acid, and finds instead citric acid. If we could previously determine the quantity of material, it would often be useful, but such a previous determination is impossible. The operator can easily ascertain how much water or dry substance a material contains; and when it is very rich in water, concludes therefrom that he will require proportionately more of it than from one poor in water under other similar conditions. But from the abundance of dry substance, no conclusion can be drawn as to the quantity which will be required for the investigation. Many parts of plants contain large quantities of cellulose, starch, and other ordinary constituents, which may be readily detected, but little of the remaining constituents. Frequently all the constituents are present in rather considerable quantities, so that the investigation can be terminated with a little material, unless one constituent is present in very small quantity. In such a case a

very great mass of material must be operated upon to obtain the constituent which is present in small quantity, because from a smaller quantity of the material we cannot obtain enough to arrive at a conclusion upon its nature by a suitable research. If we abstract from the weight of a substance under examination the weight of water which it contains, also that of the inorganic constituents and the weight of cellulose which remains after the material has been treated with ether, alcohol, water, diluted acids, and alkalies, we obtain an inconsiderable residue, which represents all the other bodies together present, except the cellulose, water, and inorganic constituents. As a general rule, we seldom find more than 300 grains of these bodies in from 3 lbs. to 5 lbs. of the crude material, which must be subjected to a close investigation if we would arrive at a correct view of their true nature. From this general estimate, it will be seen that 5 lbs. of crude material is a quantity that scarcely is sufficient at any time for the completion of an analysis. The least quantity of material is required in those cases where the known, easily recognized constituents are in the smaller quantity, and the unknown ones, on the contrary, are in the greater quantity.

SECTION 3.—*Treatment of materials with various solvents.*

The material mechanically prepared for the investigation should be divided into several parts, and each part treated with a solvent to obtain a number of extracts, which are to be submitted to a further examination.

The fluids most frequently used for a long time for this purpose are ether, alcohol, and water; the latter is often mixed with acids or alkalies. The ether is generally used in a perfectly pure condition, the alcohol mixed with more or less water, according to the strength of the spirit required. Experience has shown that water, after it has extracted bodies from a material which are quite soluble in water, also possesses the power of dissolving substances, as already mentioned, which are either insoluble, or difficultly soluble *per se* therein. This disadvantageous circumstance occurs less with alcohol, and still less with ether. In consequence, it has become a general rule to treat the material first with ether, then with alcohol, and lastly with water, when it is intended to treat it with these three solvents. I have found it the most convenient to extract a portion of the material with hot water, another portion with cold water, a third portion with acidulated water, a fourth portion with ammoniacal water, a fifth portion with alcohol, and to treat a sixth portion with ether. In peculiar cases, a treatment with alcohol containing ammonia or potash is suitable. The preparation of these solutions, as well as the precautions to be therein observed, will here be more minutely discussed.

I.—*Treatment of the substance under examination with boiling water.*

The treatment with boiling water, as previously stated, should afford us a decoction and a distillate, of which the former will contain the non-volatile constituents and the non-volatile compounds of the volatile bodies in

so far as they are soluble in water, the latter the volatile, or rather the constituents, distillable with water, of the material. For the treatment of the material under examination with water, an ordinary still is required. The still, which must be sufficiently capacious, is filled with the water intended for the extraction of the material, and this is heated to the boiling point. When the water boils, the material suitably divided, is thrown into the water, the receiver adjusted, and proper care taken for its refrigeration. To introduce the divided material, carefully into the boiling water, and to prevent burning as much as possible, I employ an apparatus which I will in a few words here describe. This consists of a cylinder, open at the top and closed at the bottom, made of tinned iron plate. The sides and the bottom of the cylinder are perforated with holes, so that the cylinder represents a coarse sieve. Externally, at the bottom, three short feet are attached, and a cover of tinned iron plate, likewise perforated, closes the cylinder in which it is inserted, being in diameter about two lines less than the cylinder. The material is introduced into this cylinder without being pressed, and the cover is laid on. By means of twine the cover is fastened to the place where it lays. The size of the cylinder depends upon the capacity of the still. In filling the cylinder, care must be taken that the material is only in such quantity that it is covered at least three inches high by the water in the still when the cylinder is inserted in the boiler, which is done while the water boils.

When the material is thus introduced into the already boiling water, the decomposing action of ferments contained therein on the other constituents is prevented, from which decomposition products would be produced whose formation must not be permitted. We know by the treatment described that bitter almonds afford no bitter almond oil, and mustard no mustard oil. It is of importance in the investigation of the distillate to prevent the formation of volatile products from the non-volatile constituents of the material. But independently of the volatile decomposition products which could be formed when the directions mentioned are not observed, decomposition might occur which would give rise to erroneous ideas of the composition of the substance under examination in the investigation, of its watery decoction, because there are in many plants bodies, besides ferments, which are broken up into two or more non-volatile products when they are long in contact with water and ferments. This is the case when the material is placed in cold water and then heated to the boiling point, which occupies a longer time the greater the quantities of material and water that are to be raised to the boiling point. The root of the *rubia tinctorum* is an example of this kind, which contains a peculiar ferment by which ruberythric acid in the presence of a ferment is decomposed into alizarine and sugar, when the comminuted root is placed in cold water and then heated to the boiling point. On the contrary, when the divided root is introduced into boiling water, the ruberythric acid remains unchanged and

dissolves in the water, while the ferment is converted into an inactive condition.

With materials which contain easily oxidizable constituents it may be readily perceived that by the introduction of the substances into boiling water their oxidation takes place in a much smaller degree than by being immersed in cold water and subsequently heated. The decoctions which are obtained according to the method here recommended are on that account generally much paler than those produced by gradual heating.

When the substance to be extracted has been sufficiently long in contact with the boiling water, and no more volatile products can be detected in the distillate, in case such have been formed therein at the commencement of distillation, the operator, after the neck has been removed, withdraws the cylinder and its contents, places it on a capacious dish or basin to catch the droppings, and presses the material in a press between two vertical plates. The decoction is filtered, whilst hot, through paper. To prevent it cooling while being filtered, as large a number of funnels as are necessary should be employed. If, in consequence of the liquid cooling, anything should be separated by the filter which had been previously dissolved, the filtration must be performed by means of a hot water funnel. From a watery decoction of the flower-buds of *capparis spinosa*, the quercitrine, or the so-called rutinic acid, is precipitated by cooling in voluminous flocks. The distillate thus obtained is either pure water, in those cases where the substance under examination did not contain bodies distillable with the vapor of water, or such as are not in a free condition, but in the form of non-volatile compounds, or there are volatile bodies dissolved therein or suspended with others. The distillate is then either clear when the volatile substances are readily soluble in the water distilled over with them, or are present in very small quantity, or it is turbid from suspended undissolved substances which exist in the fluid either in the form of oily globules, or crystals, but seldom in the form of flocks. More frequently, when the material contains a considerable quantity of volatile substances which are not readily soluble in water, an oily film swims on the surface of the distillate, or collects at the bottom of the liquid. The volatile bodies which may be dissolved or suspended in the distillate belong often to the most different classes of bodies. Volatile bases, volatile acids, hydrocarbons, indifferent volatile oils containing oxygen, aldehydes, compound ethers, may be contained in such a distillate. It is a rare case for only one volatile substance to be found by a close examination of the distillate. If the substance under examination contains only small quantities of volatile substances, recourse must be had to cohobation. When a portion of the material has been treated in the manner directed, and a sufficient quantity of the distillate has been obtained to point out by means of a preliminary examination to what classes of bodies the volatile substances found therein belong, it may be easily determined whether cohobation is necessary or not. Assuming there were only volatile acids or volatile

bases contained in the distillate, a cohobation would be superfluous even when their quantity was very small.

The treatment of the watery decoction and the watery distillate for the purpose of ascertaining their constituents, the next section will describe.

II.—Treatment of the material to be examined with cold water.

A portion of the material, as finely divided as possible, is treated with cold water. As much water is employed as will thoroughly saturate the material, and cover it about a couple of lines. After a short time, the saturated mass is placed upon a fine strong piece of linen, and the liquid pressed off by a gradually increased force. The liquid thereby obtained is filtered through moist paper, in as many small filters as possible. In most cases the liquid passes slowly through the filters. By this method of treatment it is not possible to prevent the formation of decomposition products by the action of the ferment on the other constituents. As all these decompositions proceed with more difficulty in proportion to the lowness of the temperature, this disadvantage may be considerably removed by employing ice-cold water for the extraction, and by preventing the heating of the filtering liquid by surrounding the funnels with such water. The filtrates should be collected in vessels surrounded with cold water.

The further investigation of this filtered liquid will be described in the next section. It serves principally for the detection of those substances which remain undissolved by the treatment of the material with boiling water, because they become by elevated temperatures insoluble in water, that is coagulated, as is the case with bodies analogous to albumen, emulsin, &c.

III.—Treatment of the substance to be examined with acidulated water.

A portion of the material is treated with water, to which a little sulphuric acid has been added, and heated in a water-bath, or by a current of steam. The boiling hot fluid, together with the material previously placed therein, is allowed to cool, and the fluid is separated from the undissolved material, which is then gently expressed. This fluid serves chiefly to detect some few organic acids which are contained in the material, in the form of salts insoluble in water and alcohol, but which are set free by the sulphuric acid, and thereby become soluble in water; and also to show the presence of organic bases, which are contained in the form of sulphates in this extract.

IV.—Treatment of the material to be examined with ammoniacal water.

For the preparation of the extract with water to which a little caustic ammoniac has been added, a small quantity of the residue is taken which is obtained after boiling the material with water and expressing it. This residue is introduced into water containing ammonia, and the whole allowed to stand quietly some time, until the liquid has properly saturated the substance. After passing the liquid through linen and expressing

the substance, the liquid is filtered through paper. This fluid is suitable for the detection therein of some bodies which are soluble in alkaline liquids, but not in water or dilute acids. Only when the addition of dilute hydrochloric acid produces a precipitate in this fluid is it prepared on a larger scale for the further examination of the precipitate. When no precipitate results, it is no longer employed for the investigation.

V.—Treatment of the material to be examined with alcohol.

Whether alcohol containing more or less water is employed for the extraction of the material, whether the extraction should be conducted at an ordinary temperature or at a boiling heat, depends on the properties of the material to be extracted. The operator must first convince himself whether a considerable quantity of fat is present or not. It is easy to ascertain this with certainty. The extraction of a small quantity of the material with ether, and the evaporation of the ether, proves this. It may be readily observed whether the residue, after the evaporation of the ether, contains much fat or not. When the material contains only a very little fat, the alcohol should be applied boiling hot for the extraction. In this case a spirit of .825 sp. gr. should be employed. If a great quantity of the fat is present in the material, which is the case when by expression between cold or heated plates the chief bulk of the fat is separated, weaker spirit of specific gravity, between .850 and .855, must be employed, and the extraction performed at an ordinary temperature.

Should the material be treated with hot alcohol, and a large quantity be operated upon, a still is the best for this purpose which is provided with an inner receptacle for the material and the alcohol. The heat employed is that of a water-bath. When the head of the still is affixed, and proper care taken for cooling the distillate, but little alcohol is lost, because its vapor is condensed. If volatile substances exist in the material, they pass over simultaneously with the spirit. Easy as it is to separate volatile acids or bases from the spirit, it is equally difficult to remove volatile oils therefrom. Such alcohol is constantly again and again used for the extraction of a fresh quantity of the same material; in the worst cases it can be employed for combustion, &c. When the spirit has acted sufficiently long on the material to be extracted, the head of the still is removed, and the receptacle and its contents together withdrawn from the still, then the liquid is strained through linen, and the material is expressed by slowly increased pressure. The alcoholic decoction is filtered while hot through paper, and placed aside to cool, whereby frequently bodies separate which are more difficultly soluble in cold than in hot spirit. The extraction of the material with cold alcohol is conveniently performed in a bottle with a very wide mouth, which is furnished with a glass stopper well ground in. It should be of such dimensions that materials to be introduced should almost fill it when loosely inserted therein. It is better to employ several small bottles instead of one large one. Into these bottles the quantity of

material is introduced necessary to fill them, the material is covered with spirit, and the completely filled bottles closed with glass stoppers. After standing 24 or 36 hours in a moderately warm place, the spirit is poured off. As far as possible this filtered extract is preserved in a stoppered bottle quite full, and the material is treated with a fresh quantity of spirit, which is allowed to remain on the material for examination 24 hours. The extract thus obtained is employed for the extraction of a second quantity of material instead of fresh spirit. The extracted material is taken from the extracting vessel and expressed; the expressed fluid is treated in the same way as that obtained by pouring off. In this manner suitably concentrated extracts are obtained. As in Robiquet's glass apparatus for extraction a little material can only be introduced at once, and on account of the danger of its breakage when operating with hot alcohol, I use an extraction apparatus of tinned iron plate for the extraction of large quantities of the substance for examination with cold alcohol, or the extraction of smaller quantities with hot alcohol, with which it is not worth the trouble to employ a still. This apparatus is so arranged, that it permits the employment of hot or cold alcohol with equal facility. The apparatus consists of two concentric cylinders joined together, which are about eighteen inches high. The diameter of the inner cylinder is from four to five inches, and the diameter of the outer one double that size. Both cylinders are fastened together below by an horizontal ring of tinned iron plate. The inner cylinder projects about an inch below. This projection passes through a ring which is fixed to a funnel. When the funnel is fastened by its spout to a filter stand, it is only necessary to fix the funnel to the apparatus for extraction firmly in a vertical position. The inner cylinder is closed at the bottom with a finely perforated plate. The space between the two cylinders can be filled with water at any required temperature. From a flask closed with a perforated cork, through which passes a glass tube twice bent at right angles, steam is conducted into the water between the cylinders. Any required temperature can be obtained during the time of extraction by regulating the heat under the flask, and thus regulating the current of steam. To prevent the evaporation of the alcohol added to the material which fills the inner cylinder, into the hole at the bottom of which has been inserted a loose layer of cotton wool, the cylinder is closed with a tin cover, but not hermetically tight. When the space between the two cylinders has been filled with hot water, it is closed with a circular cover, which has a perforation to admit the steam tube to the water. It is evident that this tube must reach nearly to the bottom of the vessel. To be able to empty the water conveniently which is placed between the cylinders, a small cork is attached to the external cylinder at the bottom of its outer edge. When the extraction is conducted in this apparatus, the alcoholic extract passing through the material is poured back several times on the mass undergoing extraction, to increase the period of contact. When the extract appears sufficiently concentrated, it is

placed aside, and a fresh quantity of alcohol employed for the further extraction. The latter weak tincture is used instead of pure spirit for the extraction of a fresh portion of the material, so as to render the extract as strong as possible.

The further treatment of the alcoholic extract, whether prepared at ordinary temperatures or by heat, will be described in the next section.

VI.—*Treatment of the material to be examined with ether.*

The treatment of the material with ether is effected at ordinary temperatures in Robiquet's glass apparatus for extraction, or with large quantities in such an apparatus made of larger dimensions of tinned iron plate. In many cases it is necessary to treat the material to be extracted with ether previously to macerating it in alcohol. This is the case when free fatty acids are contained in the substance under examination. These acids are even dissolved out with other bodies by the exhaustion of the material with cold alcohol containing water. To surmount this disadvantage, these fatty acids must be removed by treatment with ether. In fresh materials, the presence of free fatty acids can seldom be detected. On the contrary, in substances which have been kept a long time, they can be frequently recognized. In these cases the fatty acids result from the decomposition of the fats contained in the fresh material.

VII.—*Treatment of the material to be examined with alcohol containing a small quantity of ammonia or potash.*

For this purpose a small quantity of the material is taken, and one portion is macerated with alcohol containing potash, and another with alcohol containing ammonia. The alcohol contains sufficient alkali when to an ounce of the spirit six or eight drops of a concentrated aqueous solution of potash or ammonia have been added. This operation must be performed in well stoppered bottles, which must be quite full of the material, but lightly packed. The alkaline spirit is poured in until the bottle is full up to the stopper, which is then closed. By the admission of the air an oxidation of the dissolved bodies would easily result. After standing several hours undisturbed, the contents of the bottle are placed on a linen filter and gently pressed. The fluid is mixed at once with as much hydrochloric acid as will render it slightly acid, and it should be observed whether a precipitate is produced in consequence or not. When no precipitate results, no further proceedings are taken; on the contrary, should there be a precipitate, a larger quantity of the material must be treated in the manner described. The method of further examining these solutions will be given in the next section.

To be continued

Editorial Department.

THE ACT OF PENNSYLVANIA REGULATING THE SALE OF POISONS.—The attention of our readers is directed to the communication at page 117 in relation to the law on the sale of Poisons. It will be there observed that according to the construction of the law by a member of the Bar, the liabilities of apothecaries and others who retail poisons, is much greater than at first was supposed, and that difficulties may occur in which the apothecary, with every intention of doing right, may get himself into trouble. We do not believe this mode of construing the law would be upheld by a jury, as against an apothecary, in a case that was reasonably within the usual action of physicians. We believe every apothecary who has a just regard to his reputation would hesitate to put up the prescription of a well-known physician, which, from its deleterious character, might do mischief, and therefore he would be much less likely to do it on a false one intended for illegitimate purposes. The law does not say that the dispenser shall know the writer of the prescription. For the same reason that we do not justify an apothecary in dispensing a genuine prescription, that evidently conveys the probability of error on its face, we do justify him in putting up a properly drawn prescription that conveys the probability of correctness, though it prove to be not written by a graduate. The law does not define who is a physician. The same power that made the law, grants the authority under which Eclectics, Homœopaths, Veterinary Surgeons and other irregular practitioners practice medicine, and it would hardly intend to confine the right of prescription-writing to the regular practitioners of medicine.

Further, we do not agree with Mr. Bonsall in believing that the law applies to the regular preparations of the Pharmacopœia in which any of the five prescribed poisons may be used, as Fowler's Solution, Laudanum, Syrup of Wild Cherry Bark, Tincture of Nux Vomica, etc., else it would be necessary to label those preparations "Poison" when prescribed by a physician, a course which would hardly be approved by the Faculty. In relation to the meaning of the expression, "personal application of some respectable inhabitant of full age," we feel more doubt—and would be glad to know whether the law really means, that the head of a family only is an eligible person for a purchaser of poison, who has no power to delegate his right to a servant, however well known the latter may be to the seller of the poison. If this be so, the apothecary should know it—because by

far the larger portion of corrosive sublimate that has been sold for legitimate purposes to housekeepers, has been obtained by servants with or without a written request for the same from employers, the servants being of full age and known to the apothecary. Should such quibbles and strainings of the letter of the law be, as has been suggested by Mr. Bonsall, capable of being sustained before a jury, it is high time that every apothecary was awake to the risk he runs in the conduct of his business.

We believe the only really valuable feature of the law, over and above the ordinary care of a respectable apothecary, is the requirement to keep a regular register, full and clear, of the several sales of poison. To us the law points in its spirit chiefly to criminal poisoning, and is intended to aid the cause of justice and to caution the dispenser.

THE DRUG EXAMINERS AND THE NEW ADMINISTRATION.—Our readers are generally aware that the Act passed by Congress, in 1848, usually called the Drug Law, requires for its execution special officers, denominated "Examiners of Drugs," at several of the principal ports of entry of the United States, viz: Boston, New York, Philadelphia, Baltimore, Charleston, and New Orleans. For a copy of this law see vol. 20th, page 292, of this Journal, and for subsequent action in relation to its working, the reader is referred to vol. xxv. page 297.

It cannot be doubted that the execution of this law in a proper manner will greatly tend to improve the condition of the drug market, more especially at the port of New York, where so large a proportion of imported drugs are entered; and it is equally clear to those who take the trouble to examine into the actual conduct of its officers, that its efficiency is becoming less and less evident, since the first appointments, which were made under the influence of a correct appreciation of its requirements. At the port of Philadelphia the examinership is now vacant, and the late "Examiner" has, for some time past, occupied the position of an "appraiser," with a much larger salary. Whatever inspection of drugs is effected, is carried out by this officer and the general Appraiser. The suspension of the Examiner's duties must either arise from motives of economy or because the office has become a sinecure. Be this as it may, within a month or two past several candidates for the vacancy have turned up, indicating that the office is not looked upon as undeserving of an incumbent.

Our attention has been called to this subject by the earnest movements which are taking place in New York among the Medical and Pharmaceutical bodies, in relation to the drug law and its practical exponents, as the following extract from a communication by Dr. E. R. Squibb, published at New York, in the American Medical Times of January 26th, 1861, will exhibit, viz:

To the Editor of the American Medical Times—

SIR:—As the time approaches for a change in the Federal Administration, and, consequently, in many of the offices held under that authority,

it becomes an important duty and interest of the medical profession to take some thought and action upon the execution of that special law, which in 1848 was interposed by Congress for the protection of the public and the profession against the "importation of adulterated and spurious drugs and medicines." During the month, commencing Nov. 20, and ending Dec. 20, foreign drugs and chemicals, to the amount of half a million of dollars, passed through the New York Custom-House, all of which are used in either food or medicine, and about \$200,000 of this is used in medicine alone, including some \$80,000 worth of opium and cinchona barks, the remaining value being made up in some two hundred different articles. All these are, or should be, in accordance with the law, subjected to a critical examination—not all by analysis or assay, because that would be impossible for any five persons to accomplish, whilst one man only is supplied by the law, and that with neither office nor apparatus—but by the judicious application of a thorough knowledge of drugs and chemicals, of their mode of preparation and adulteration, and of the application of the proper tests of quality in equivocal and suspected cases. These facts are all that will be necessary to show the primary and vital importance of this law to the medical profession and the public. Yet it is liable to become almost a dead letter when the offices of inspector are held by incompetent or careless persons; and still more as the commercial interests of importers generally are in direct opposition to a faithful execution of the law. A few words upon each of these conclusions may serve to place the matter in its true light. *First*, as to the importance of the law. If opium, cinchona barks, rhubarb, ipecacuanha, copaiba, colchicum, camphor, chamomile, aloes, nux vomica, cannabis, and scammony, not one of which is or can be produced in this country, are indiscriminately admitted from abroad, without regard to character or quality, the universal effect of competition and trade upon all open markets would supply these articles of all grades of value, and the lower grades in greatest abundance, because in trade, price and profit both take precedence over quality. Hence a large proportion of the profession and the public must, from this cause, be supplied with inefficient, impure, and often deleterious drugs. As the profession of medicine and the public will probably continue to use these articles, and have not in themselves the means or knowledge necessary to ascertain their true value, short of their application to human life and human suffering, it becomes evident that this law is of primary and vital importance in the true sense of those expressions.

Second. A good law is efficient, even when not fully carried into execution, because its existence, as such, makes it possible to carry it into effect at any time and in any case. Thus those who are timidly disposed to do wrong, are held partially in check. But even such persons have a gradual tendency, little by little, to try its force, until its provisions are insidiously disregarded and annulled. Hence, although the simple existence of a law of this kind upon the statute books does efficient service for a time, it soon becomes almost a dead letter; whilst through venality, incompetency, or carelessness, it is very liable to become far worse than useless, since it not only does not accomplish the object in either case, but must stand mischievously in the way of legitimate trade and commerce. That the natural effect of such a law is adverse to the exclusively pecuniary interests of importers, is evident from the facts, that, unlike most other classes of merchandise, the sensible properties of drugs and chemicals afford but little reliable information as to their intrinsic value; and that hence inferior articles may, with comparative ease, be either falsely

or ignorantly represented to be of superior quality, and be sold at better profit. The effect of the present law is well illustrated in the canvass now actively going on in the drug market here for the office of drug inspector at this port. Several candidates are in the field, they or their friends all actively engaged in getting the signatures of druggists and importers to their recommendations and claims for the office; and the canvass is carried on in the usual spirit whereby each strives to forestall the other in private and political influence, and to bring to bear the various interests and sympathies that can be made available, while the character of each is freely discussed. One name has been mentioned in the canvass which at once excited an expression of active opposition from a partner in one of the best drug houses in this or any other city, upon the ground that, if the person so named should occupy the office of inspector, the standard of quality would be raised so high, and would be likely to be so applied, as to materially injure the drug market of this city, and force the commerce in importation of drugs into other cities and channels wherein the law might not be carried out. In other words, that the policy of New York is to place such a person in the office as would not be likely to interfere with importations, by carrying the law into effect—that is, to find the man who in the necessary oath prescribed by the law, will “solemnly, sincerely, and truly swear, diligently and faithfully to perform the duties of the office as prescribed by the act, to prevent the importation of adulterated and spurious drugs and medicines,” and who will yet be sure not to do what he solemnly swears he will do. One such fact, well established as this is, goes far to show that, if the medical and pharmaceutical professions, through want of due thought or action upon this subject, leave it in the hands into which it naturally falls, namely, the political and importing interests, to fill these offices in the districts in which they are established by this law, these professions may be very sure that their interests, and those of the public, will be destroyed, or so perverted as to render this important and excellent law not only useless but absolutely mischievous. And this naturally introduces the special object of this article, namely, to urge upon the medical organizations in the immediate neighborhood of the six collectorial districts, where special examiners are authorized by this law, to take prompt and determined action in the matter. At this port it is especially incumbent upon the medical and pharmaceutical bodies to make an early and energetic movement, because probably two-thirds of all the imported drugs and medicines used in the United States are entered at this port. The new administration should be early and earnestly apprised, not only of the vital importance of this law, but also of the difficulties and responsibilities of its proper execution, and of the danger which attends the appointment of its officers through political or pecuniary interests and considerations. The law requires the Secretary of the Treasury to appoint “suitably qualified persons” to carry into effect its provisions, and, as in cases of appeal from the decision of the Examiner, it provides that the Collector shall procure the services of some “competent analytical chemist, possessing the confidence of the medical profession, as well as of the colleges of medicine and pharmacy, if any such institutions exist in the State in which the collective district is situated,” to decide such questions of appeal, it is plain that the law does in itself recognise in the medical and pharmaceutical organization, a proper, legitimate, and necessary influence in its execution and application. And it is not probable that any administration would fail to be convinced of this importance, and, when so convinced by proper representations, would fail to exercise due care in the appointments, or give due and respectful weight and attention to

the combined action of the medical and pharmaceutical institutions which are invoked by the law itself, whenever such institutions might offer their services and advice in filling the offices in their respective districts. This is precisely the course which will probably be adopted by all the medical and pharmaceutical organizations of this district with unanimity and decision. The Academy of Medicine and Kings County Medical Society have already discussed the subject, and fully recognising its importance, have appointed committees to confer with each other, and with the College of Pharmacy, with the State Medical Society, and all other societies that may be accessible. These committees have power, after due conference, to lay before the new administration the full appreciation by the bodies they represent, of the importance of the law, and the very great importance of having it faithfully executed at this port by a competent officer; and to offer to the appointing power, if such service be desired or permitted at their hands, the nomination of a proper person to fill the office. By this joint committee the whole medical and pharmaceutical, and, as far as these can represent it, the whole public interest of this district will be concentrated and represented, and will thus be rendered easily available to the appointing power, if that power should decide to accept their proffered suggestions and advice in the important local duty of selecting a proper person to fill the local office. By reserving their nomination until it is either asked for or admitted, the committee places itself and the bodies it represents, upon the high ground which is inaccessible to the indignity of a refusal to recognise its true spirit and intention in the matter; whilst in making the Government fully aware of the importance of the law, and the difficulties of getting it properly executed, it fulfils the whole duty of the medical and pharmaceutical professions, and imposes the whole moral responsibility upon the appointing power. At the same time, if it should be permitted to make a nomination, and if that nomination should be confirmed, the medical profession through it assumes a most important responsibility to the public at large. Such responsibility, however, legitimately belongs to the medical and pharmaceutical professions, because their true interests unite them with the public interests at large, and because from education, and from daily familiarity with the subject in all its various bearings, they are the most competent to form a correct judgment. Besides this, their local position gives them additional knowledge of the requirements of a local office in their midst, and of the character of any person whom they would be willing to nominate and endorse for such an office.

In a close scrutiny of this law "to prevent the importation of adulterated and spurious drugs and medicines," its excellent objects and intentions are prominently apparent, and the general means by which it provides for the accomplishment of its objects are wise and good, and are as practical and sufficient as any ordinary foresight could make them, independent of experience in actual application. But in the course of some ten years' experience in application, certain points and portions of the law appear to need amendment and amplification to meet the necessities of a more faithful and thorough application; and such amendments and alterations have been proposed, and are still strongly advocated by the New York College of Pharmacy, and by persons most familiar with its operations, including Dr. Bailey, who for many years held the office of examiner at this port. Some of these amendments and amplifications, in the order of the writer's estimate of their importance, are as follows:—

First. The appointing power should be in the President, with a confirmation by the Senate; and the President should be legally authorized to seek for, or admit of, the advisory nomination of candidates for the office,

by the medical and pharmaceutical organizations of the districts in which they are to officiate; or, what would be still better, the appointments should be made only after a thorough examination before the medical boards of examination of the army or navy. By such an examination the competency of candidates might be most thoroughly and effectually determined, and the true intentions of the law be best secured. These Boards meet annually, under the orders of their respective departments.

Second. The salaries offered by the law are not at all in proportion to the required integrity, knowledge, and skill. The highest salary, namely, that of sixteen hundred dollars per annum for the port of New York, is no adequate compensation for the faithful and capable examination of some six millions of dollars' worth of drugs and medicines, with the necessary records, reports, statistics, etc., which should belong to the office. Again: the thorough and faithful execution of the office where such vast quantities are presented, and so much at stake, is entirely beyond the possible capacity of any one person, no matter what his skill or knowledge may be. Therefore, the officer should be an inspector, rather than an "examiner," and should be allowed an assistant, to be appointed by his own selection and nomination, at a salary of one thousand dollars per annum. The inspector should receive at least three thousand dollars per annum at this port, and fifteen hundred dollars at the other ports, and should be provided with the proper office accommodations, and the necessary apparatus and reagents. The present law appears deficient upon all these points, since it supplies only a single man, and at a salary below that of a fair merchant's clerk, and fails to provide him with the means necessary to the performance of his duty, whilst he thus, unaided, is made responsible for the quality of some six millions of dollars per annum worth of articles of primary importance as food and medicine, and also of revenue.

At the suggestion of the President of the College, the subject was brought before the last meeting of the Board of Trustees of the Philadelphia College of Pharmacy, and a committee appointed to examine whether the College should recommend any course of action to the appointing power, or take any other steps in the matter. That Committee have since reported a memorial to be submitted to a special meeting of the College on the 4th of March. In the discussion which occurred anterior to the appointment of the Committee, the views of the joint medical and pharmaceutical bodies of New York, as set forth in a communication from one of their representatives, were considered, especially the propriety of recommending the Government to avail themselves of the Naval and Army Board of Medical Examiners, but the sense of the meeting seemed against that suggestion, as not being so well calculated to produce practically efficient officers as an examination in which the Colleges of Pharmacy took part. To us the merit of the New York suggestion rests mainly in the fact that the Government would have confidence in the impartiality of the Navy or Army Medical Examiners in their decision of the scientific merits of the candidates; in regard to the practical business fitness of the candidate who might be theoretically qualified, they would have to call to their aid the testimony of other parties. We confess, however, to have but little confidence in the probability of much improvement in the working of the law whilst it has to contend with the side issues of political aspirants.

PROCEEDINGS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.—The Executive Committee of this Association have sent the Proceedings of the meeting of 1860 to all the members by post or otherwise, except to those in California, and they hope soon to obtain a medium of forwarding the package destined for that State. If persons who are entitled to them have not received their copies, they should notify the Chairman of that Committee (W. Procter, Jr., Philad.) and suggest a safe medium of sending the book. It is much to be desired that those members of the Association who feel a lively interest in its success and advancement, should not at this juncture, when the condition of public affairs absorbs so large a share of the attention of every citizen, lose sight of the importance of this benevolent and disinterested scientific movement in favor of the improvement of pharmacy and pharmacutists—a movement so catholic in its character that it should proceed uninfluenced by the political aspects of the country. Let such members take the initiative, by encouraging those gentlemen who agreed to contribute special reports to the St. Louis meeting, to accomplish their work, so that those who may go to that distant city may not be disappointed in receiving a return of valuable scientific information. We have some valued members in the south and south-west, and as the meeting at St. Louis is at the most southern point at which a meeting has yet been held, it is to be hoped that the attendance of southern members will be larger than heretofore, especially as the means of travel by the great water routes of that region are ample.

INFAMOUS QUACKERY.—It is said of some poisons, that when taken in an overdose, the emesis they excite proves the safety of the subject. So of quackery. In some of its forms it is so self-evidently false and disgusting that all reasonable persons will at once reject its assaults. Our attention was recently called by a friend to a handbill from a quack of this genus purporting to be a "veil Doctor" with astonishing natural powers. After various statements of his ability, he has the assurance to declare that he appeared before the National Medical Convention of 1850 at Washington, for the revision of the Pharmacopœia, and demonstrated his remarkable powers. He then refers for information to a list of names of Physicians and Pharmacutists of New York and Philadelphia, among the rest our own, who were there in attendance, and which he probably extracted from the preface of the U. S. Pharmacopœia. It need hardly be said that the whole affair is false, and that the use of names in this manner, for a false pretence, would subject the rascal to legal action under the proposed new law of Pennsylvania.

THE CAVENDISH SOCIETY.—Information is hereby given that the 13th volume of Gmelin's Chemistry can now be had of us, as the Society's agent at Philadelphia, as the only volume for 1859—price \$5.40—and also it may be well to state that Dr. Redwood, General Secretary of the Society, in a letter dated London, Jan. 11, 1861, states that the 14th volume of Gmelin's

Handbook is now in press, and that it may be expected by the last of April. We also take this opportunity to say that the last invoice of books from London embraced several copies of Gmelin, from the 2d to the 13th volumes, inclusive, which are held for sale—the first volume being out of print.

CALIFORNIA YEAST.—Since our issue of September last, several communications have been received relative to the so-called "California Beer Plant." Mr. Perrot, of Philadelphia, was informed that—

"A party of California gold diggers left a pan containing some molasses under a tree, and on returning to the same spot after a few days, during which period it had rained, they found it to contain a liquid resembling beer; hence its name.

Probably some nitrogenous matter from the tree fell into the pan during the rain, which subsequently originated the fermentation of the sugar."

Mr. G. W. McFee, of Monroe, La., after examining the "California Beer Seed," is "disposed to think it is nothing but the result of fermentation," and finds that, "if you mix half a pint of molasses with a quart of water, and set it in the sun, this ferment will form in the bottom of the jar, and will continue to form on the addition of fresh portions of syrup or molasses and water, resembling the 'seed' in every particular."

We doubt not these inferences are correct, and that all those who imagined unpleasant results to arise from the use of bread made with the "California Yeast," will have to attribute such effects to other and graver causes than the ferment in question.

OBITUARY.—THOMAS SOUTHALL, of Birmingham, England, a valued member of the Pharmaceutical Society of Great Britain, died at Edgbastin, Birmingham, January 12th, 1861, after a few days' illness, from inflammation of the lungs. Mr. Southall was born in Leominster in 1795, and was apprenticed to the late John Bell, of Oxford street, London, father of the late Jacob Bell. Mr. Southall was a prominent member of the Society of Friends, and one of the founders and supporters of the Pharmaceutical Society, and a contributor to the pages of its Journal. His retiring, modest character always prevented Mr. Southall from accepting public honors or employment. As a pharmacist, he stood deservedly high. The Birmingham Gazette, from which we extract most of the above, attributes to this gentleman a most unselfish and liberal character, united to a modesty that was invincible to all the temptations of honor and position.

DR. KLOTZSCH.—Died at Berlin on the 5th of November, 1860, Professor Johann Frederick Klotzsch, M. D., Ph. D., aged 55 years. Dr. Klotzsch was originally an assistant apothecary, and diligently pursued the study of natural history, and especially of botany. He was at one time curator of the herbarium of Sir William J. Hooker, and subsequently of the Royal Herbarium of Berlin. Dr. K. was a careful and laborious observer, and wrote much on botanical and pharmacological subjects.